POST CONVENTION ISSUE May 1942

THE FOUNDRY

FIFTIETH YEAR

Speed Production for VICTORY with

Republic

REPUBLIC STEEL — PRODUCTION FOR VICTORY

PIG IRON

"CHATEAUGAY" Low-Phosphorus Copper-Free
"REPUBLIC" (Northern) Foundry, Basic and Malleable
"PIONEER" (Southern) Foundry and Basic

AND REPUBLIC METALLURGICAL ASSISTANCE

Also Truscon Foundry Flasks • Republic Core Wire • Foundry Nails

REPUBLIC STEEL CORPORATION • General Offices: Cleveland, Ohio

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Refining with PURITE *insures* CLEANER IRON AND STRONGER CASTINGS

The value of Purite in refining cupola cast iron is now generally recognized by progressive foundrymen and metallurgists everywhere. The refining is more than simply removing sulphur. Occluded gases are expelled by the boiling action set up by Purite and entrained oxide-silicates and other non-metallic impurities are washed out of the iron and carried off in the Purite slag.

Untreated **Treated**

Photomicrographs of an all-scrap mixture cast iron at 1,000 X etched with 2 percent nital, before and after refining with Purite. See how Purite refining washes out manganese sulphide and complex silicate inclusions, breaks up the phosphide areas, reduces the size of graphite particles and produces a more uniform, dense structure iron.

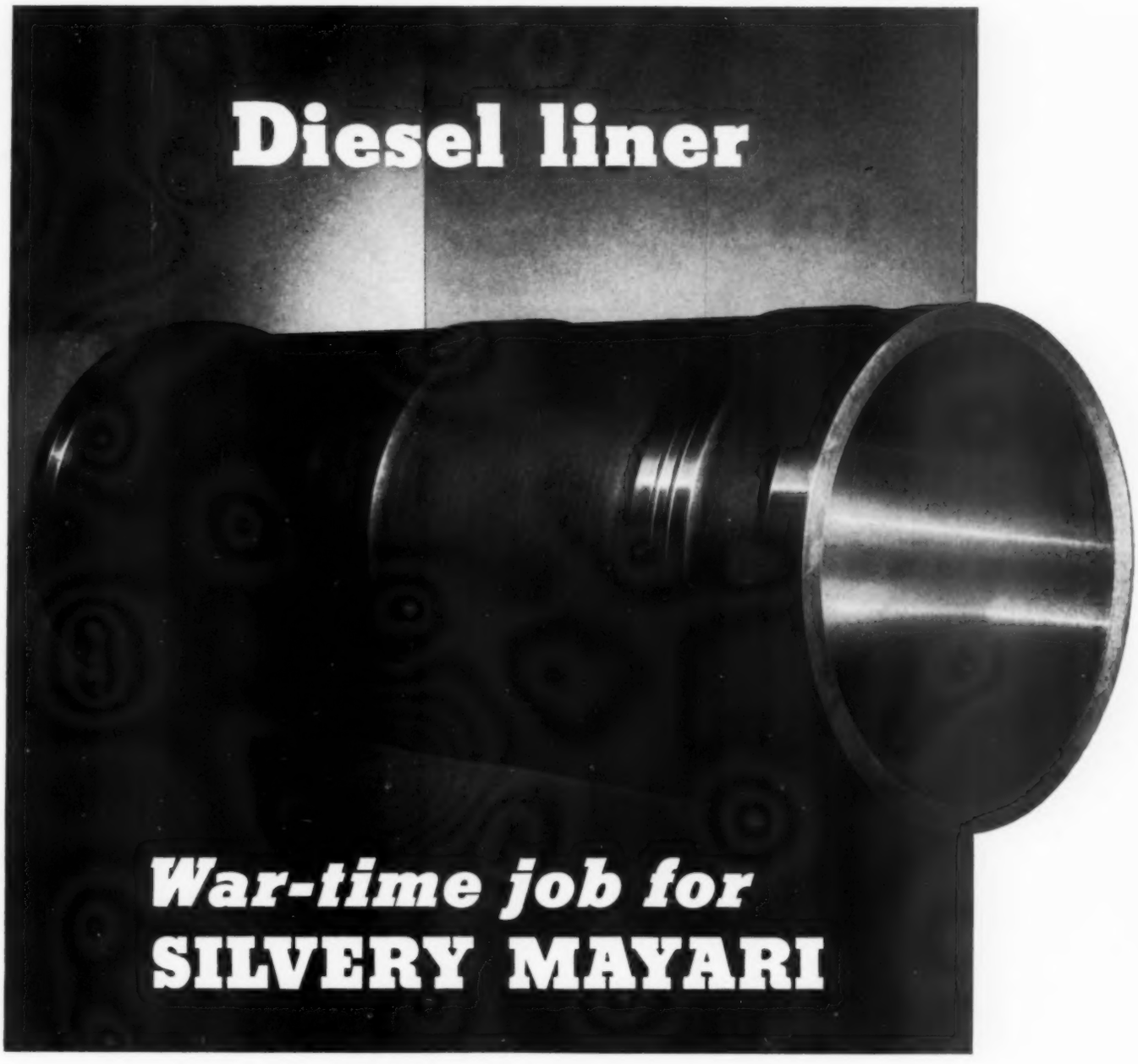
Molten iron is always charged with gases and gaseous compounds as well as some non-metallic impurities, more or less varying with the character of the charge, melting practice and refinement of the metal in the hearth of the cupola or in the ladle. These tend to be squeezed out as the iron freezes in the mold, sometimes causing pinholes or gas pockets and segregated defects.

Purite reacts with non-metallic inclusions or silicates in molten cast iron, forming fluid soda slags which rise out of the iron. It combines readily with gaseous sulphur which is held in the Purite slag or is driven off, along with other gases, by the boiling action set up in the iron by Purite. Thus it is seen how refining with Purite, whether in the cupola hearth or in the ladle, increases the strength and improves the grain structure, soundness and machinability of iron castings.

Ask for new bulletin P41 "REFINING CAST IRON WITH PURITE"

THE MATHIESON ALKALI WORKS (INC.)

60 EAST 42ND STREET, NEW YORK, N. Y.



The polished interior of this diesel cylinder-liner is so slick that the flies slip off when they light. The metal is tough, sound, flawless over its entire surface . . . and for a very good reason.

This casting has to withstand millions of explosions at temperatures as high as 4000 deg. F. It has to house the ponderous flying piston, guiding it with hair-breadth accuracy as it turns the crankshaft and makes the motor operate. Soft spots on the inside of a diesel cylinder liner would wear, let the liner go "out of round" and upset the smooth, efficient operation of the entire engine.

With diesel engines in the forefront of our war effort, every detail of their construction takes on increasing importance. For years, Silvery Mayari has been used in the key parts of American-built diesels. In skirts, heads, liners, pistons, and other parts, it has turned in such satisfactory performances that manufacturers have in many cases standardized on it.

Today, Silvery Mayari is working all-out on war jobs. When the war is over, and trade once again flows through peace-time channels, the lessons learned in war production will enhance the advantages of Silvery Mayari. Meanwhile, Silvery Mayari is helping in the one essential job of winning the war.

BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL

MORE—SOONER
BY USING THE BEST!

THE best possible castings in the least possible time, that's the demand today. We all know now what "too little, too late" means and we all know how invaluable time is in our race to overtake the Axis. We must make every minute count!

You can't afford to use foundry supplies which may give inferior results. A casting failure avoided here and there . . . cleaning time held always to a minimum . . . can be translated to "more—sooner."

A reliable source of foundry supplies, one with large stocks of high quality, dependable products, is your first precaution. Remember, too, that it takes the best to make the best, so . . .

Use Federal

FEDERAL GREEN BOND

You can't buy a better bond than Federal Green Bond! This ideal sand bonding agent is mined, dried, and ground in the heart of the Wyoming bentonite country.

Large capacity plus huge reserve stocks guarantee prompt delivery. Laboratory control ensures its uniformity. Fifteen years of bentonite experience guarantees the quality of Federal Green Bond.

CHARLEROI SEACOAL

Deliveries will never be among your problems if you use Charleroi Seacoal! We have just completed the installation of a new mill which greatly enlarges our capacity.

Charleroi Seacoal is the best grade of coal, carefully ground and screened. You'll save money by using it, both in your seacoal costs and cleaning time.

Have you tried Charleroi?

THE FEDERAL FOUNDRY SUPPLY CO.

4600 East 71st Street • Cleveland, Ohio

Seacoal Plant — Mines

CHICAGO · CHARLEROI, PA. · CHATTANOOGA, TENN. · DETROIT · MILWAUKEE · MINNEAPOLIS · NEW YORK · ST. LOUIS · RICHMOND, VA. · UPTON, WYO.

THE FOUNDRY

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In times like these

WHAT DOES The

Says **E. J. Hedlund**

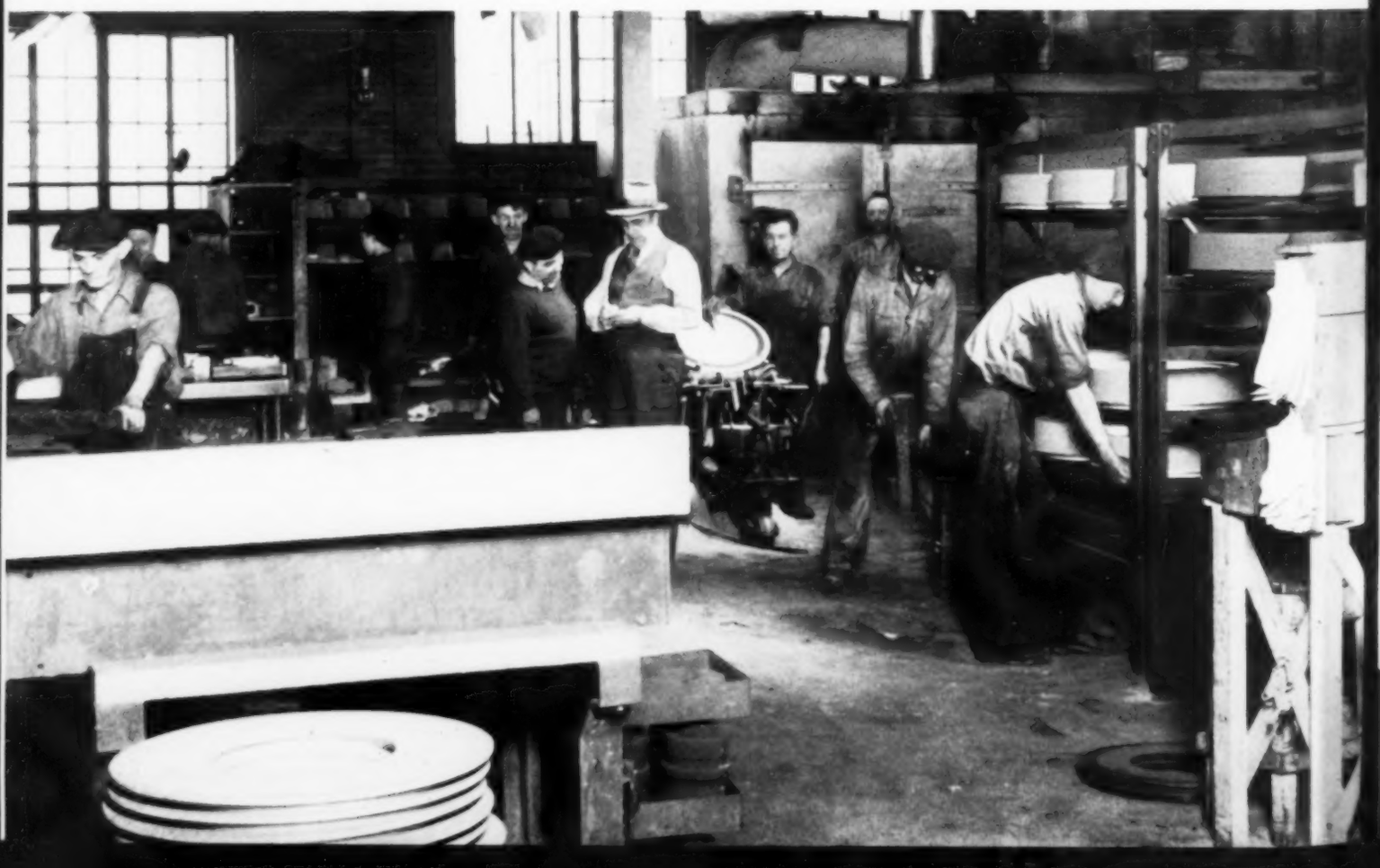
General Manager of

URICK FOUNDRY COMPANY

ERIE, PENNA.

"WE like Linoil because it has a wide range of safety and efficiency. Within reasonable limits we can use a standard ratio for all types of jobs. This is important for a jobbing foundry where a day's work may include everything from heavy chunk cores to very small and complicated ones. Our oil must be foolproof and not compounded for just a one-purpose job. It must have a fast baking speed and it must above all be economical. We get these requirements in the Werner G. Smith Company's oil and it is a pleasure for us to recommend Linoil."

Below — E. J. Hedlund shows Coreroom Foreman D. J. Iavarone just how he thinks the job should be handled. Place: Coreroom at Urick.



Jobbing Foundry Do?

It uses

LINOIL

and it keeps the wheels, the million wheels, in the thousand war industries, whirring and producing

THE importance of the jobbing foundry is sometimes overlooked in contemplating the huge production foundries—but when a single important casting, or a dozen, or a few hundred are needed, you do not go to the production plant. And when everybody in the whole country is needing castings the job foundry really goes to town. Linoil, always as popular in the job foundries as in production plants, is serving as the friend indeed in many a hot spot. Order Linoil and work with the assurance of the men of Urick.

Consider Linoil's uniformity, of which all men speak. Consider Linoil's strength, and its more-tons-per-drum. Consider Linoil's workability and its speedup at the bench. Consider Linoil's drying speed, and greater oven turnout. Consider Linoil in the mold and its reduction of core-caused defects. Consider Linoil cores in the cleaning room and the precious hours saved. Consider Linoil's moderate price. Wire for Linoil or the Linoil man.

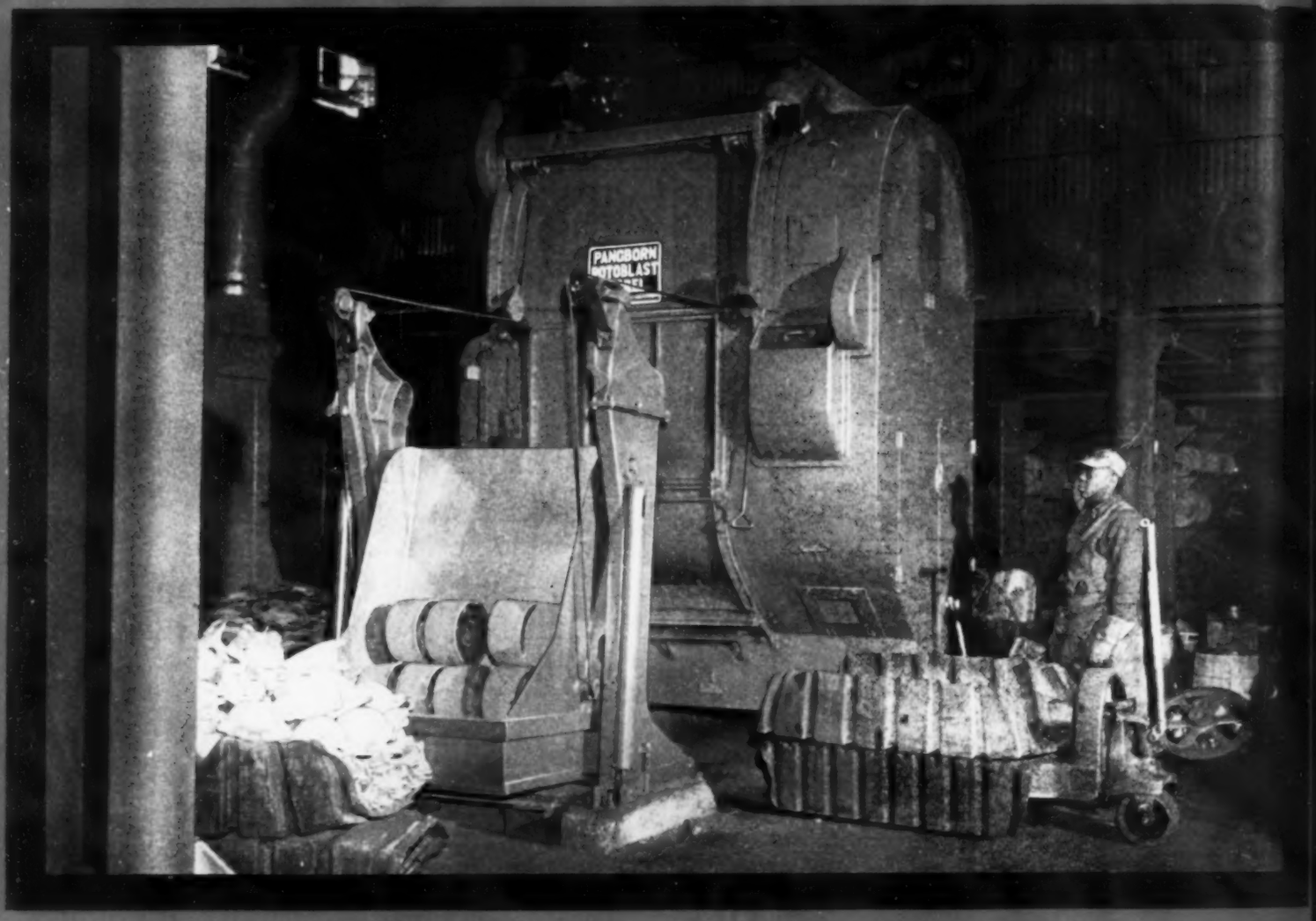
THE WERNER G. SMITH COMPANY

(DIVISION OF ARCHER-DANIELS-MIDLAND COMPANY)

2191 West 110th Street — Cleveland, Ohio

IMPOSSIBLE, HELL!

MORE Shells, MORE Ships, MORE Planes,



Here at Pangborn the boys are fighting mad. They don't want to *remember* Pearl Harbor. They want to *avenge* Pearl Harbor. So day and night they're on the job—working grimly for their part in the taking of Tokio, the bombing of Berlin, the razing of Rome. Deep down, where it really matters, the war has reached home.

That's why—to the last—we're in this thing with hot perspiring brows and clenching fists. Our men have something tremendous to work for—and they

WORLD'S LARGEST MANUFACTURER OF BLAST

PANG

PANGBORN CORPORATION . . . . . .

PANGBORN *DOES IT!*

MORE Tanks--*TO SEND THE YANKS!*

know it. They express their willingness to help, not in singing the Yanks are coming—but in getting out — *every day and night* — bigger and better ROTOBLAST and Air Blast Barrels, Tables, Cabinets and Rooms to blast clean more castings, more shells, more ships, more planes, more tanks —TO SEND THE YANKS!

MORE OF EVERYTHING TO SEND THE YANKS. IT CAN BE DONE! LET PANGBORN HELP YOU DO IT!

CLEANING AND DUST CONTROL EQUIPMENT

PANGBORN

HAGERSTOWN, MARYLAND

4 Great Core Blowers ...all CHAMPIONS!

CHAMPION CORE BLOWERS are the products of a family with whom the casting of metals has long since become a tradition, rather than a trade.

Like the ancient craftsmen's guilds wherein the master selected his pupils for inherent aptitude and outstanding ability, the designers of CHAMPION CORE BLOWERS received their early training from a foundryman, B. E. Magnuson, whose name they proudly bear—a name which has served the foundry industry for more than 46 years.

When CHAMPION CORE BLOWERS were an ideal, rather than an accomplished fact, the *Champion Foundry and Machine Co.* delivered foundry equipment to you under the following unconditional guarantee, written in clear, concise, understandable language:

"Every installation by *Champion* is unconditionally guaranteed—and we don't mean guaranteed merely 'against defects in workmanship or materials.' What we (The Magnusons) do mean is that your installation of *Champion* equipment will be guaranteed to do the job you expect it to do, in the manner you want it done. You must and will be 100% satisfied with *Champion*."

No manufacturer can offer a more all-inclusive guarantee to cover his equipment. We take pleasure in offering to the Foundry Industry 4 great Champion Core Blowers with the same unconditional guarantee that accompanies every *Champion*—a sure winner.

GHQ

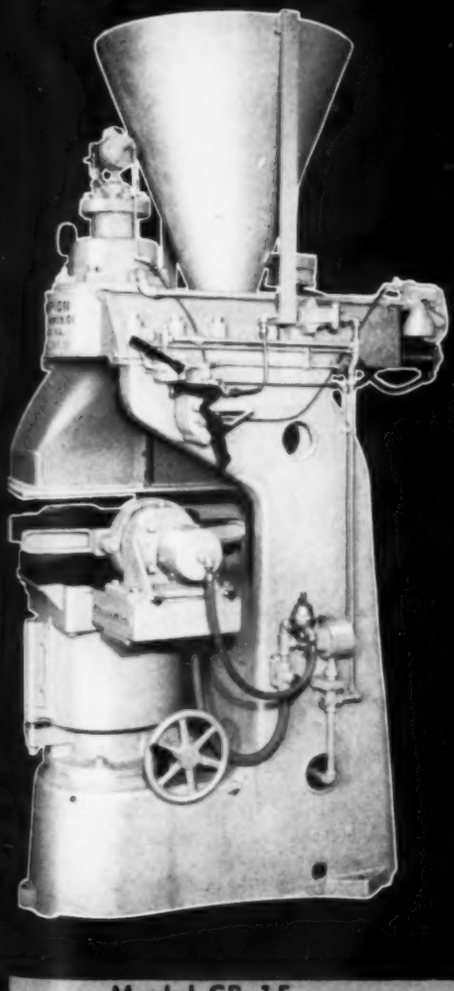
Model CB-400

Throughout the length and breadth of America, "Production" is the favorite word of foundrymen whose roaring furnaces are flashing a red glare of defiance in the face of our enemies.

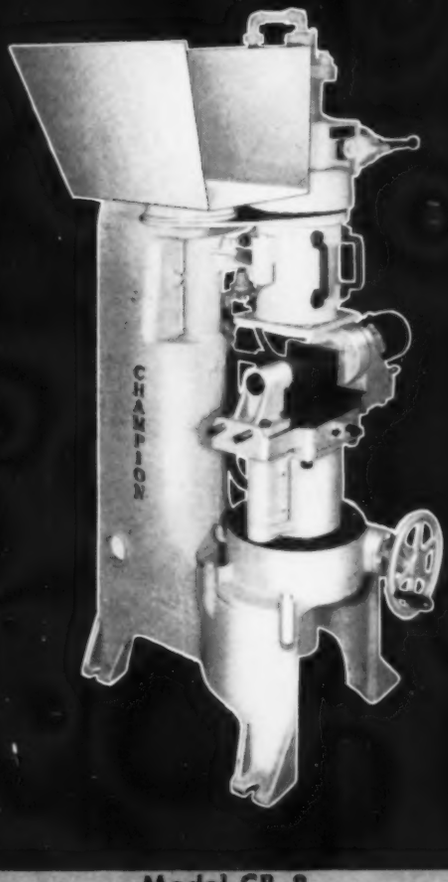
Here at Champion, GHQ, General Headquarters for *production* molding and core machines, "all out" effort is the watchword of the day. Every machine is roaring in high gear

CHAMPION

General Headquarters for Core Production



Model CB-15



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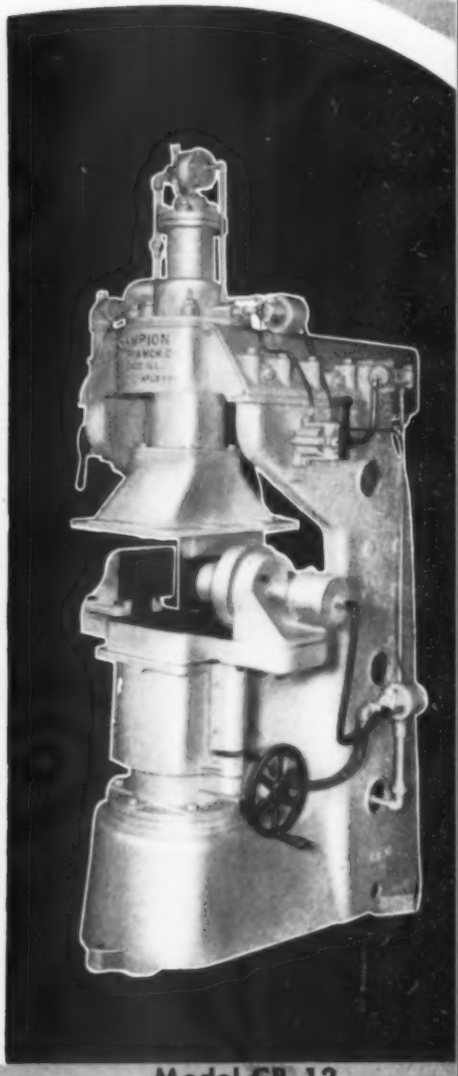


Model CB-12

and every man hour is labeled "for the future and freedom of America." As our Country's leading foundries report on *Champion* Core Blowers, we are not unmindful of the thousands of foundrymen whom we number among our friends—most of them long time users of *Champion* foundry equipment.

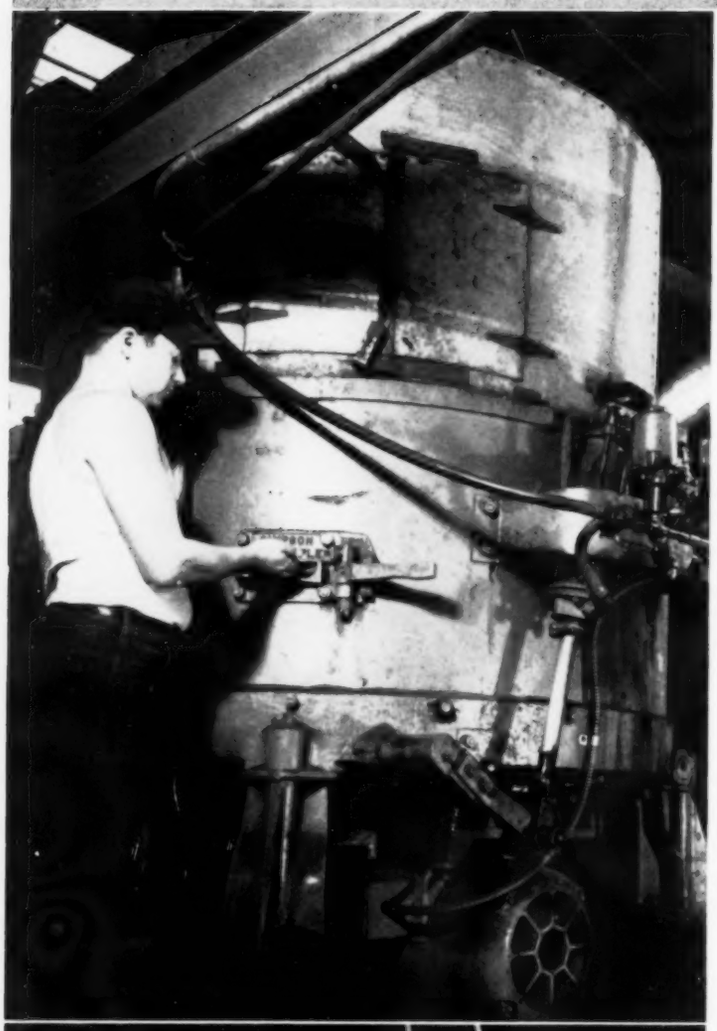
Whenever and wherever our 46 years of experience in the design, manufacture and application of production molding and core machines can be of service, *we are at your service.*

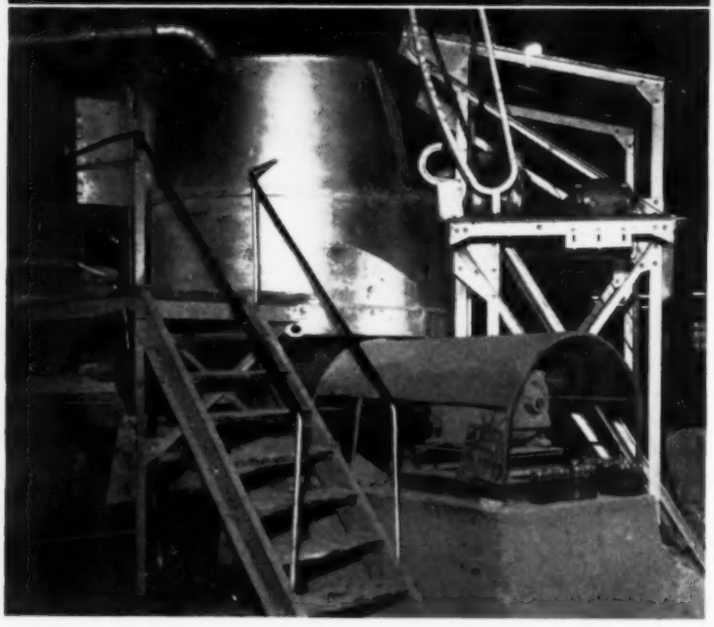
Our full time—24 hours of every day—is devoted entirely and wholeheartedly to the development of ways and means to produce more and better cores and molds for an industry which is giving 100% to the Battle of Production.

Foundry & Machine Co.

1318 WEST 21st STREET
CHICAGO, ILLINOIS

Precision Sand Preparation





. . . 4 SIMPSON *Intensive Mixers* HELP TO PRODUCE FROM 40 TO 50 TONS OF CASTINGS PER DAY AT UNITCAST CORPORATION

• The Unitcast Corporation foundry is now producing approximately 40 to 50 tons of miscellaneous steel castings per day—an important part of our country's war effort. This aggressive foundry has taken definite steps to assure perfect cores and molds, which in turn assure constant uniformity and highest quality of every single casting. That is why particular emphasis has been placed on correct, precision sand preparation, sand handling and sand reclaiming methods.

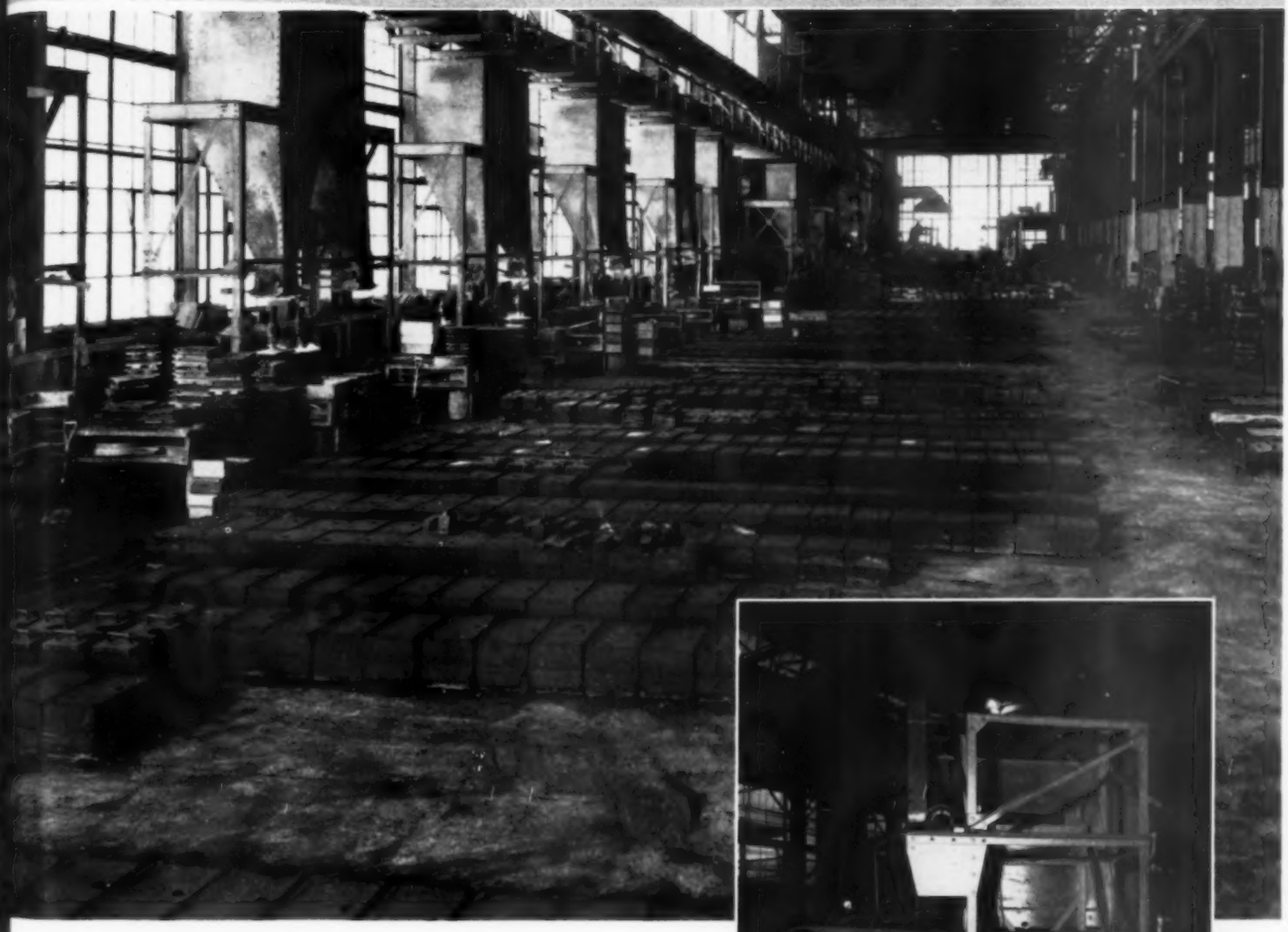
"National-designed" sand preparing, sand and mold handling equipment, plus four Simpson Intensive Mixers play an important role in helping to make Unitcastings "just right", and at the same time assuring maximum economy. Here are some of the advantages made possible through the use of this equipment:

• Total consumption of new sand approximates 450 lbs. per ton of good castings produced, as compared to most other steel foundries, where new sand consumption averages from 1000 to 3000 lbs. per ton of good castings. This record is due in part to the design of the system, which permits proper cooling and grading of the sand before it is delivered to the mixer, plus the removal of "fines" and other refuse.

• The Simpson Mixers insure uniform, properly conditioned sand: Backing sand is conditioned entirely automatically in a No. 3 unit, mixing 2000 lb. batches in 1¾ minutes. Facing sands are mixed in a No. 3 High Duty unit, handling 3000 lb. batches in approximately 5 minutes. Two No. 2 Mixers are also used, one in the core room and one in the sand reclaiming system. All equipment is operating on an average of 20 hours per day.

—These are further reasons why it will pay you to investigate Simpson Intensive Mixers and "National" foundry engineering service. Write for complete details.

Guards Quality of "UNITCASTINGS"



• *Illustrated above is a view of the large molding room at Unitcast, showing rows of carefully set up molds. At the right is a view showing the bucket loader serving one of the No. 3 Simpson Mixers. Shown at the left, above, on the opposite page, is one of the No. 2 Simpson units for reclaiming molding sand. At the lower left is a view of the No. 3 Simpson Intensive Mixer operating on facing sand.*

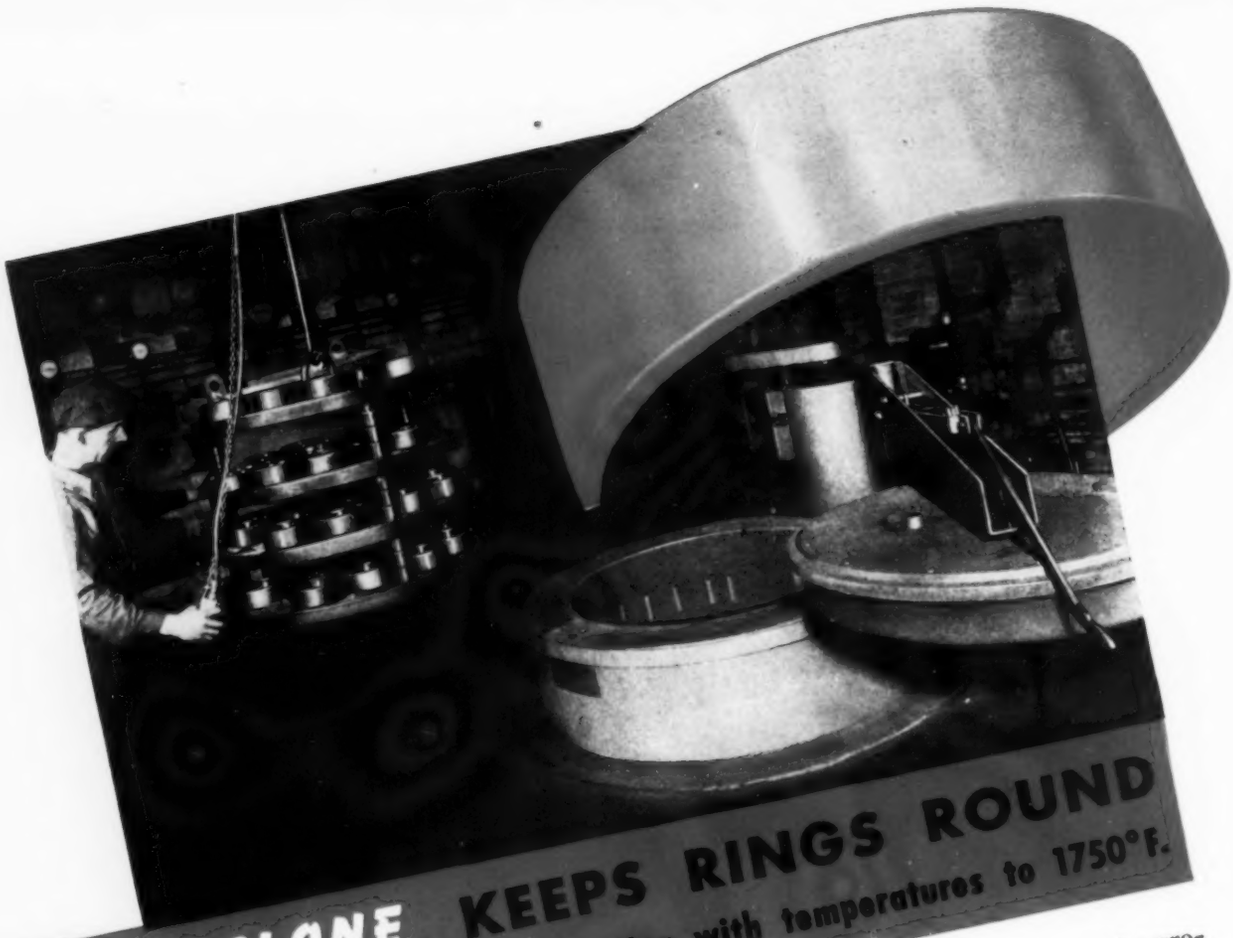
SIMPSON

INTENSIVE MIXERS

NATIONAL ENGINEERING COMPANY

MACHINERY HALL BUILDING • CHICAGO, ILLINOIS

Manufacturers and Selling Agents for Continental European Countries:—The George Fischer Steel & Iron Works, Schaffhausen, Switzerland. For the British Possessions, Excluding Canada and Australia—August's Limited, Halifax, England. For Canada—Dominion Engineering Co., Ltd., Montreal, Canada. For Australia and New Zealand—Gibson, Battle & Co., Pty., Ltd. Sydney, Australia



SUPER-CYCLONE KEEPS RINGS ROUND

by utilizing 100% Forced Convection Heating with temperatures to 1750° F.

ABOVE you see another example of the Super-Cyclone's ability to increase production, reduce handling, and minimize distortion, with 100% forced convection heating. The illustration shows a load of 63, SAE 52100, bearing races on a fixture, being charged into a Super-Cyclone furnace. When heated through, the rings will be taken from the furnace and quenched, fixture and all. When tested, they will be 62-65 R.C. and will be out of round only .006" to .010", the acceptable range.

The method used by this bearing manufacturer before the Super-Cyclone was installed was to heat the rings in a gas fired radiation type box furnace and quench individually on a special jig. This was done to hold the rings within .006" to .010" of round, which is now accomplished in the Super-Cyclone—63 at one time without jigs. The box handling demanded the constant attention of one man and then he could only turn out 8 rings per hour. With the Super-Cyclone the entire operation of loading the fixture, charging it into the furnace, heating, quenching and unloading the fixture, takes but 1 hour and 25 minutes. Only 15 minutes of this operation requires the attention of a heat treater, leaving 1 hour and 10 minutes in which he is free to do other work. It would take 7 men and 7 box furnaces to approximate the production of the one Super-Cyclone!

But let's put these figures on an 8 hour-day basis for a clearer comparison of the Super-Cyclone's potentialities in helping to solve your heat treating problems. We find that the box furnace produces 64 rings per day, as against 432 rings per day from the Super-Cyclone, a production increase of nearly 700%. It takes one man 8 hours to handle the rings from the box furnace, but only 1½ hours of the day does he devote to the Super-Cyclone turning out 432 rings. This means an extra 6½ man hours per day that can be used for other work.

This reduction of 6½ hours in handling time, increase of nearly 700% in production, and minimum distortion, is due to the Super-Cyclone's 100% forced convection heating principle. It drives the heat, at high velocity, through the work chamber, heating each piece thoroughly and accurately. Thus it avoids "one-sided" heat, which is the principle cause of distortion. The Super-Cyclone's heating range of 250° F. to 1750° F. makes it a highly flexible unit for many heating operations. Perhaps the Super-Cyclone would solve some of your present day heat treating problems. We would be glad to help you in weighing its possibilities.

This old method of putting the heated ring on a jig and quenching the whole assembly produced 8 rings per hour.

LINDBERG

CYCLONE FOR LOW COST ACCURATE TEMPERING

1. WHAT IS THE SUPER-CYCLONE FURNACE?

It is a further development of the Lindberg Cyclone furnace utilizing 100% forced convection heating with temperatures to 1750° F.

2. HOW WILL THE SUPER-CYCLONE HELP ME?

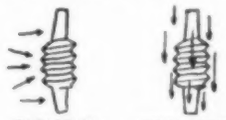
It all depends on the type of work to be done. Among the operations being handled by well over 100 Super-Cyclone installations already in service are: tempering, annealing, hardening, normalizing, and nitriding. Because the work can be preheated at any desired rate and cooled according to a definite schedule, the Super-Cyclone is well suited to stress relieving, spheroidizing, malleablizing, and other special heating operations requiring a definite cycle.

3. CAN THE SUPER-CYCLONE BE USED FOR LOW TEMPERATURES?

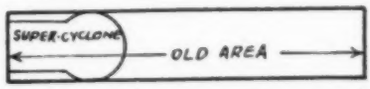
Yes. The temperature range of the Super-Cyclone is 250° F. to 1750° F. with equal heating and control accuracy within the range. This feature of the Super-Cyclone gives you a tempering, hardening, annealing, and normalizing furnace all in one and makes it a flexible unit for the small or medium heat treating department, as well as a heavy production unit for the large shop when put to work on one type of job.

4. HOW DOES THE SUPER-CYCLONE KEEP WORK STRAIGHT?

By eliminating "one-sided" heat. The work is piled up or stacked up in the work chamber, either on itself or on a fixture, and the heat is driven through it at a high velocity, heating each part thoroughly and accurately. The 100% forced convection heating principle prevents radiant heat of a source hotter than the desired work temperature from striking the charge and causing distortion. This proved itself in handling 20 pound worm gears. When hardened from box furnaces 85% went out between .015" to .025". Straightening took 8 hours per 100 worms. When hardened from the Super-Cyclone, 90% required no straightening whatsoever, and the balance were out a maximum of .010". Straightening time: 30 minutes. A reduction of 7½ hours straightening time per 100 worms.



5. HOW ABOUT FLOOR SPACE?



As a general rule, based on what the Super-Cyclone has done in other plants, you can figure that this furnace will require only ⅓ the floor space of any other type of equipment to handle the same or increased production. At a large midwestern plant annealing grey iron castings, one Super-Cyclone using but 1/6 the floor area, replaced 8 radiation type box furnaces *and turned out twice as much work!* It would take 7 box furnaces and 7 men to approximate the production of the Super-Cyclone shown on the opposite page. Another manufacturer, hardening worm gears found that one Super-Cyclone did the work of 3 box type furnaces occupying 3 times the floor space.

6. HOW ARE PRODUCTION POSSIBILITIES FIGURED?

You can roughly check the production increases possible through the Super-Cyclone, by spreading parts to be heated on the floor, one layer thick, as laid out in a radiation heated furnace. Then take those same parts and stack them up in a 36" circle, 4' high, making allowance for spacers or supports. Figure it will take a maximum of 3 hours to heat the stacked up parts on a fixture and 5 minutes to quench the lot. Ordinarily you will find production increases of 200% to 1000% possible. The parts remain on the fixture for quenching and tempering, a substantial saving in handling.

7. DOES THE NAME SUPER-CYCLONE MEAN THAT IT IS A LARGE FURNACE?

No. A standard size Super-Cyclone is made with a chamber dimension as small as 16" diameter x 20" deep. The name Super-Cyclone denotes the ability of the furnace to increase production and keep work straighter by using 100% forced convection heating with temperatures from 250° F. to 1750° F.

THE name "SUPER-CYCLONE," like Topsy, just grew. During its infancy on the drawing boards, the engineers planning its potentialities, called it the "Super" Cyclone. Then came its adolescence in the shop where the boys referred to it as the "Super." When troubles developed, the service men called it something else. But whether it was affection, anticipation, or just the lack of a better name, most everyone called it the "Super."

In the advertising department we got excited at the prospect of creating a name for the new product . . . a name that would go down through the ages with Buick, Bon Ami, Aunt Jemima, Carter's Little Liver Pills, and many others. We burned the midnight oil with creative fervor . . . "Little Demon Heat Treater" . . . "The Chinooker" . . . "The Senator" (100% forced convection hot air) . . . "Breath of Sahara" . . . and other names, equally as inadequate, were conceived. Each new appellation was referred to as a name for the "Super" and before we knew it, *we were calling it the "Super" too!* When the time came to announce it to the trade, for want of a better name, we had to release it as the Super-Cyclone. We knew then, that we were but pawns in the hand of Fate. Our dream, of launching and christening this new furnace with a bottle of "7-up" and a few well chosen words, had blown up in our faces. We feared that in letting it be known as the "Super" Cyclone, the general opinion would be that our advertising department had "gone Hollywood."

Soon, reports on the new installations came in sounding like letters from Bob Ripley . . . and they continue to come. We know now, that this furnace by any other name would be as remarkable. The "Super" has clicked in the field! The advertising department still feels it owes an apology for the name "Super-Cyclone," but its performance is all that the name implies.

STANDARD SIZES IN WHICH THE SUPER-CYCLONE IS AVAILABLE

Delivery time is speeded considerably when standard size furnaces are selected, rather than special sizes which must be drawn up. Drawings are available for the following sizes of Super-Cyclones all of which have been built and are in operation. Most are gas fired, although a number are available electrically heated.

CHAMBER SIZE
16" diameter x 20" deep
22" diameter x 26" deep
22" diameter x 36" deep
25" diameter x 20" deep
25" diameter x 30" deep
25" diameter x 48" deep
28" diameter x 28" deep
28" diameter x 48" deep
28" diameter x 60" deep
33" diameter x 36" deep
33" diameter x 48" deep
38" diameter x 36" deep
38" diameter x 48" deep
38" diameter x 60" deep
43" diameter x 48" deep
48" diameter x 72" deep
60" diameter x 36" deep
60" diameter x 48" deep
60" diameter x 72" deep

100 SUPER-CYCLONE INSTALLATIONS ALREADY IN SERVICE

IMPORTANT NOTE: Like all other Lindberg developments, the Super-Cyclone has been thoroughly proved under 24-hour a day production conditions for a minimum of 12-months before announcement to the trade. Every effort has been made to restrict the sale of these units until the probationary period was completed. In spite of this, however, many of those who have seen the furnace in operation during the past 18-months have quickly been aware of its production possibilities and requested that units be constructed for them. Thus, over 100-Super-Cyclone installations are in service from coast to coast. One or more of these is near you, as is a Lindberg District Office, staffed by practical and competent sales engineers. The Super-Cyclone is *not* a cure all, nor do we represent it as such. It is speeding production, turning out straighter work, and cutting costs for many firms however, and we will be glad to survey its possibilities for you, on your work, at your request.

LINDBERG ENGINEERING CO • 2453 WEST HUBBARD ST • CHICAGO

F U R N A C E S

H DRYZING FOR SCALE-FREE AND DECARB-FREE HARDENING

They call it "CULLET"

BROKEN bottles to the layman—cullet to the glass manufacturers. This scrap glass is segregated according to color, washed, uniformly broken and shipped to the glass factories, where it is introduced into the glass batches to produce a better, cheaper product.

Essential to the successful use of cullet is the removal of all iron which would discolor or spoil the new glass, a job ably performed by Dings Magnetic Separators.

This is just one of thousands of applications of separation to lower costs, speed work and produce better results.

If you have an iron-removal problem—reclaiming scrap, conditioning foundry sand or any similar job—submit it to Magnetic Separation Headquarters.

Write today for the Magnetic Alchemy Bulletin describing the latest equipment for these jobs.

Separation Headquarters Since 1899

Dings MAGNETIC SEPARATION HIGH INTENSITY

THE DINGS MAGNETIC SEPARATOR CO., 512 E. SMITH St., Milwaukee, Wis.

CABLE ADDRESS "CARMAN CLEVELAND"

SURVEYS
REPORTS
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PLANT DESIGN
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EDWIN S. CARMAN, Inc.
ENGINEERS and FOUNDRY CONSULTANTS
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SPECIALIZING IN
FOUNDRY OPERATIONS

COST SYSTEMS
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EXECUTIVE CONTROL METHODS
PRESENT OPERATION MODERNIZED

CUPOLA CONTROL SYSTEM

THE "CARMAN STANDARD METHOD" IS BEING USED IN IRON, STEEL AND NON-FERROUS FOUNDRIES.
COMPLETE SERVICE FOR ALL THE PLANT ACTIVITIES, FROM THE PURCHASING
OF RAW MATERIALS TO THE DIVIDEND PAYMENT

Foundrymen:

CONSERVATION . . .

Should be the Order of the Day!

HOW?

1. Conserve CAPITAL for new building by securing more output in your present buildings.

2. Conserve MANPOWER by making it possible in a day's time for a man to produce more product with the same expenditure of effort that he now does.

3. Conserve POWER by producing more output in the same number of hours.

4. Conserve, if expansion is necessary, by applying the above three principles plus alterations and additions to the present plant.

5. Conserve in new plant construction by a thorough study of the operations intended and design buildings accordingly.

ACTION

For War Production

ABRASIVE COMPANY GRINDING WHEELS

are basic tools for war production. Their efficient cutting action on a myriad of grinding applications is essential for the manufacture of vital war equipment. Chances are *you* can benefit from their use on your grinding jobs. Write for details.

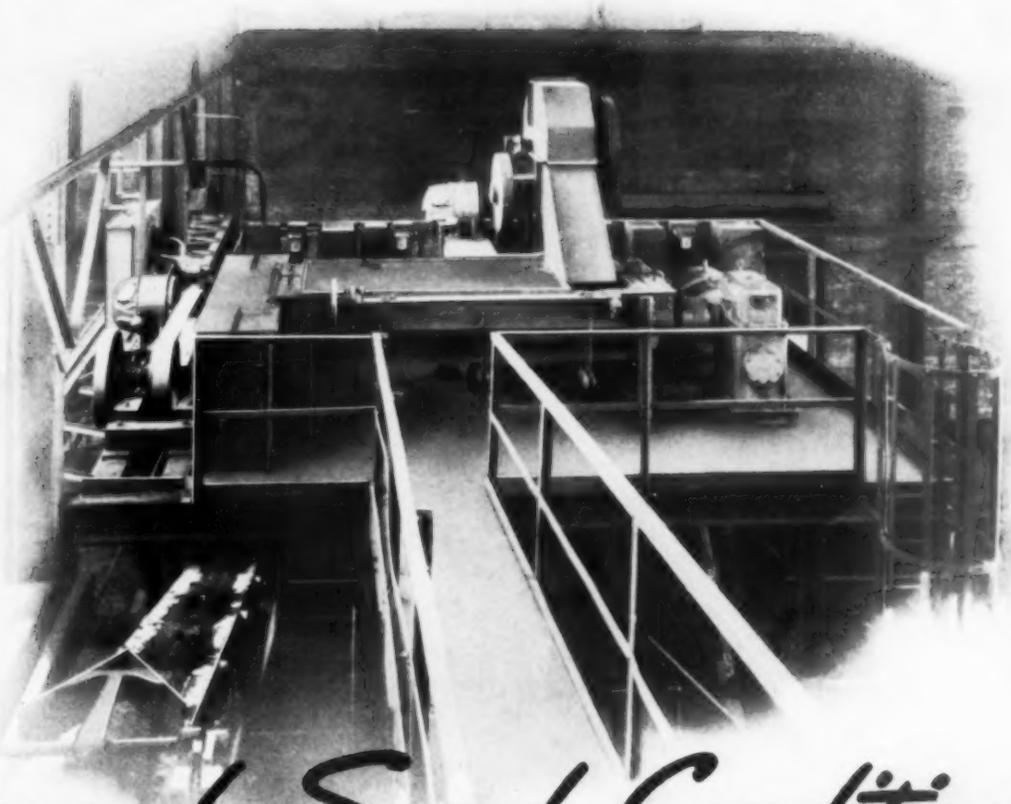
1892—*Fifty Years of Service to Industry*—1942

ABRASIVE COMPANY

DIVISION OF SIMONDS SAW AND STEEL CO.

Tacony & Fraley Sts., Philadelphia, Pa. ★ 127 S. Green St., Chicago, Ill.

Distributors In All Principal Cities



Thorough Sand Conditioning

is essential to successful operation

Bartlett-Snow Conditioning Equipment gives the sand new life under mechanically controlled conditions. It provides a more uniform and more thorough mix than can possibly be secured in daily production with hose and shovel methods—and the work is done usually overhead, resulting in great savings of floor space.

Complete facilities are available including pug mills or paddle mixers, that churn and mix old sand, new sand, and binder—compact mullers that give the sand, continuously, the mulling coating action required for silica sand poured at high temperatures—batch mullers—aerators in two styles—storage and tempering bins—weigh hoppers—feeders—even tempering belts with automatic water sprays when a minimum of reworking is required.

No two systems are exactly alike. Each installation must be engineered for the individual plant—and the size, type and arrangement of equipment varied to meet the tonnage per hour desired, and the floor space, head room and other conditions that vary with each case.

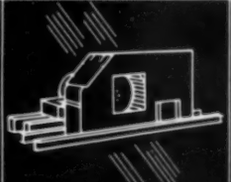
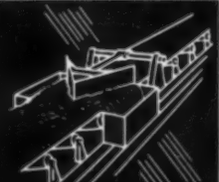
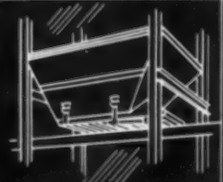
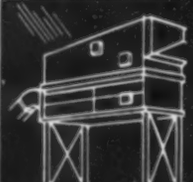
Our recently issued 40-page Foundry Bulletin No. 90 illustrates many different Sand Conditioning Plants and other Bartlett-Snow Foundry Equipments. Copies are available on request.

THE C. O. BARTLETT & SNOW COMPANY
6201 Harvard Avenue **Cleveland, Ohio**
Engineering and Sales Representatives in the Principal Cities

BARTLETT-SNOW

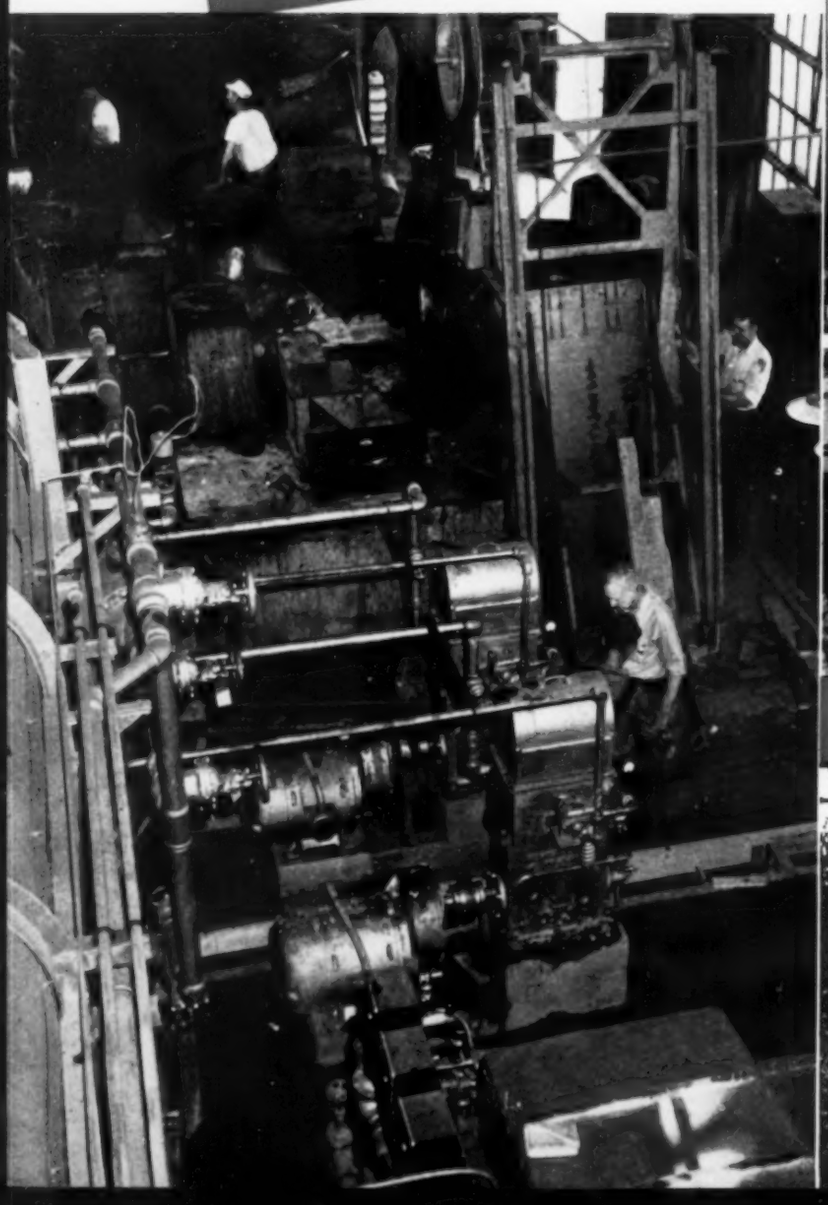
ENGINEERS AND FABRICATORS FOR THE FOUNDRY INDUSTRY

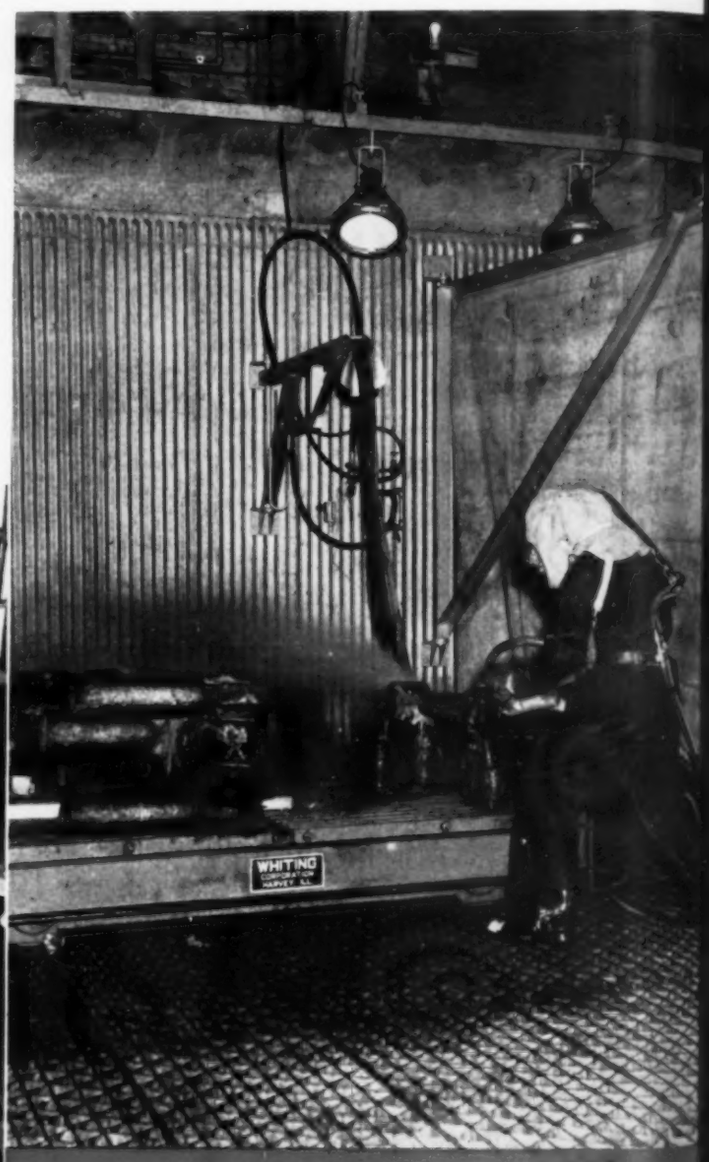
Complete Sand, Mold and Castings Handling Equipment for any requirement, including

Shakeouts	Elevators	Aerators	Sand Distributors	Bins and Feeders	Apron Conveyors	Dust Collectors
						

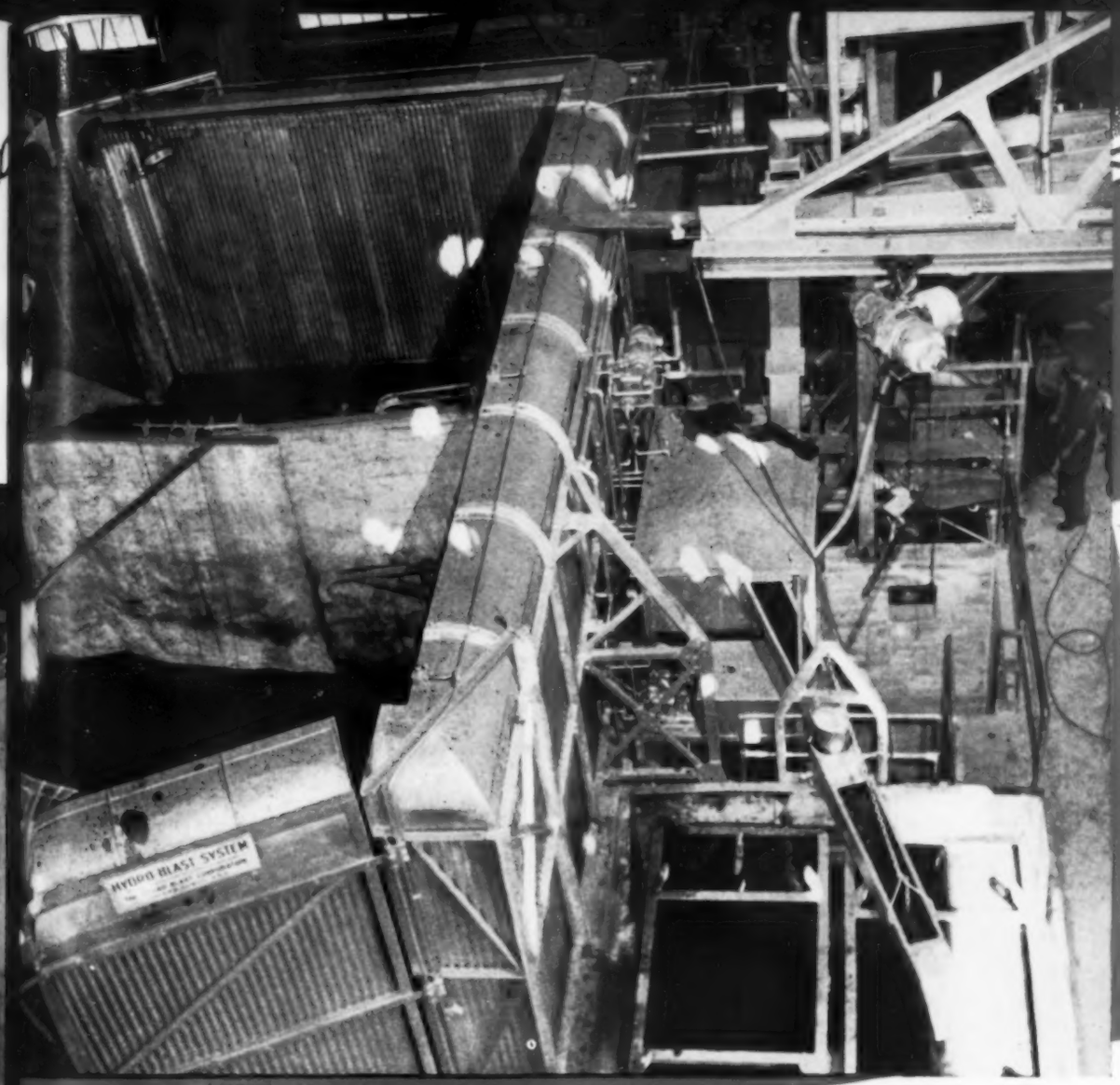
Onward Thru Ships

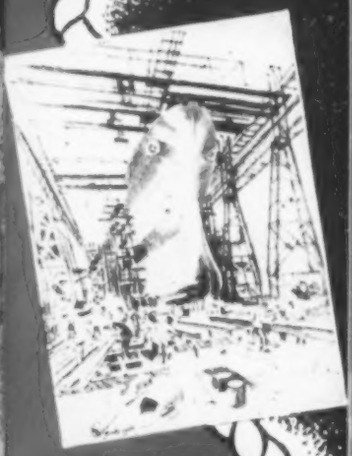
The photographic reproductions on these pages show three views of the HYDRO-BLAST wet sand cleaning and sand recovery system at the Washington Navy Yard.





Manufacturing war heads at Newport Torpedo Station by Vernon Howe Bailey.





Bow of the mighty USS Alabama from a drawing by Vernon Howe Bailey.

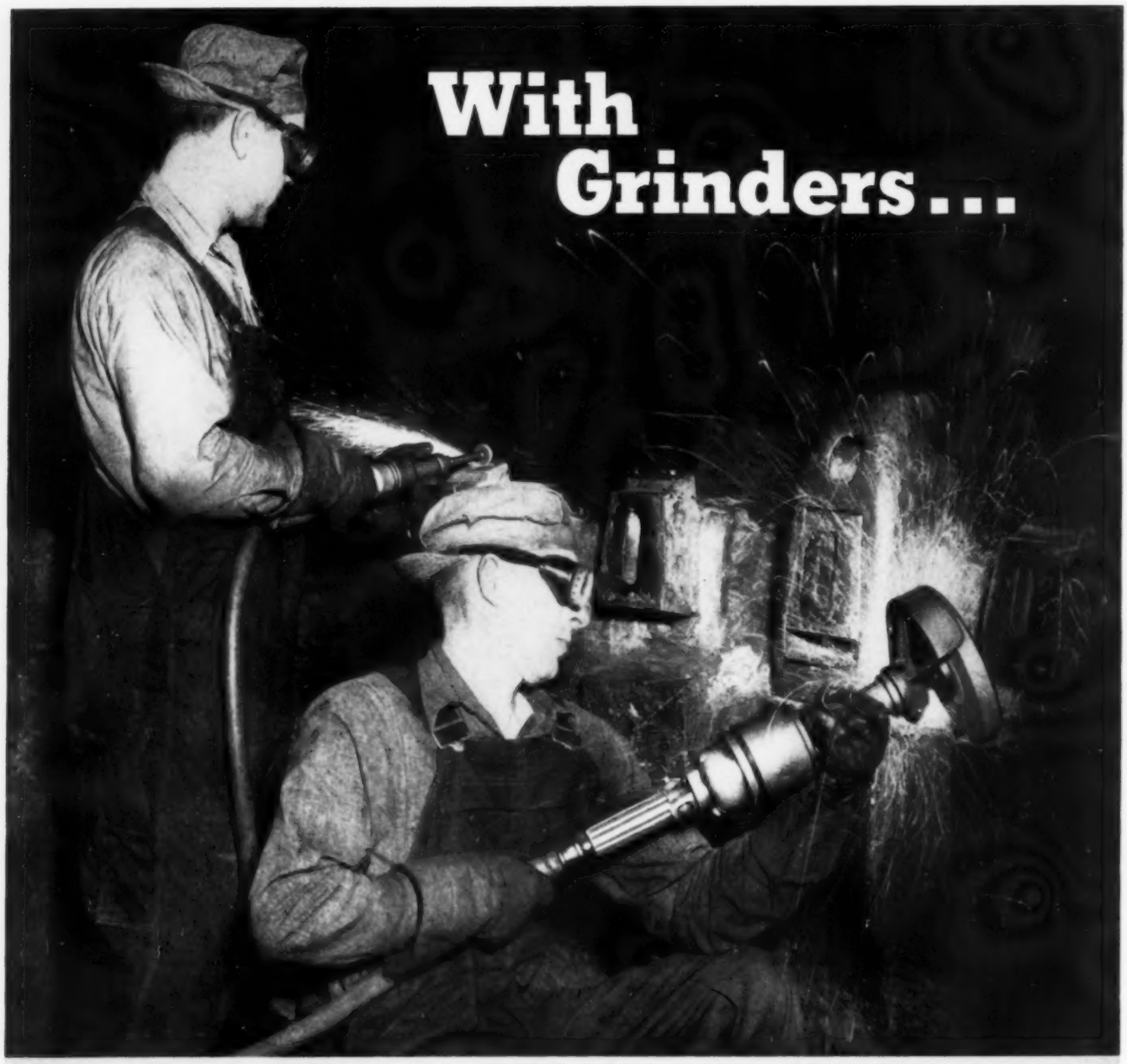
U.S. NAVY

WASHINGTON NAVY YARD USES HYDRO-BLAST AND SAVES 85% OF FORMER NEW SAND REQUIREMENTS

Behind the armed forces of the United States, stands an alert army of civilian engineers and mechanics who are determined that our boys shall "get there fustest with the mostest." And we might add "at the lowest cost." Toward this end, these men of vision search constantly for ways and means to do their jobs better and faster. That is why the management at the Washington Navy Yard were willing pioneers of *Hydro-Blast*. It is because of their vision and determination that Navy castings are cleaned *cleaner* and casting production cost is notably lower. Today, new core sand requirements at the Washington Navy Yard are 85% less than before *Hydro-Blast*. Sand that was formerly scrapped is recovered, washed and dried by *Hydro-Blast* at less cost per ton than it formerly cost to remove this same sand to the dump.

HYDRO-BLAST CORPORATION

3118 CLYBOURN AVENUE, CHICAGO, ILLINOIS



It's Metal Removed Per Shift That Counts!

With Ingersoll-Rand "Multi-Vane" Grinders you get maximum grinding efficiency. Their design incorporates three most important features—great power—light weight —and sensitive control. With these modern air tools your operators can do more work with less fatigue — remove more metal in less time.

8-97

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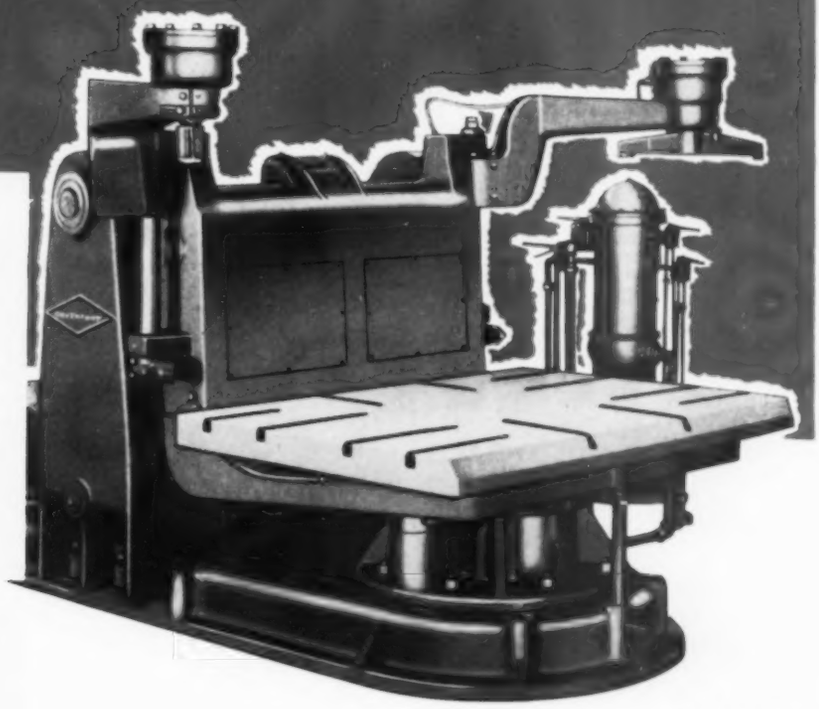
Simplify

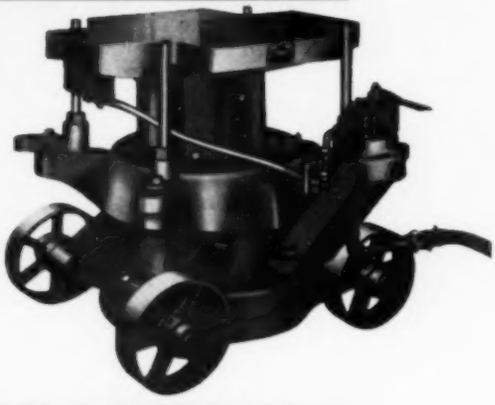
YOUR FOUNDRY OPERATIONS

with "DAVENPORT" MODERN MOLDING MACHINES

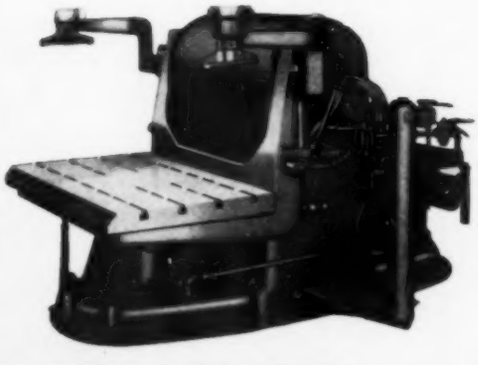


Jolt Rollover Draw Model "SA"

Plain Jolt



Portable Jolt Pin-Lift



Jolt Rollover Draw Model "A"

FASTER METHODS MAKE CASTINGS CLEANER AND MORE ACCURATE

"DAVENPORT" Molding Machines are easy to operate; simple to install, sturdy in construction and positive in action.

In fact, untrained men with only natural mechanical skill can produce exceptional results at a great savings of time and labor.

New Production records are being reported from the foundries of America with "DAVENPORT" Molding Machines. They are doing their part to break down the bottleneck of foundry production.

"DAVENPORT" Line of Molding Machines

★JOLT ROLLOVER DRAW MACHINE
Model "A" (Six Sizes)—Capacity from 1,000 to 12,000 lbs.
Model "SA" (Seven Sizes)—Capacity from 750 to 12,000 lbs.

★JOLT STRIPPER OR PUSH-OFF MACHINES WITH ADJUSTABLE LIFT PINS
Six Sizes—Capacity from 1,000 to 10,000 lbs.

★PLAIN JOLT MACHINES
Fourteen Sizes—Capacity from 200 to 25,000 lbs.

Write today for our NEW 1942 Catalog.

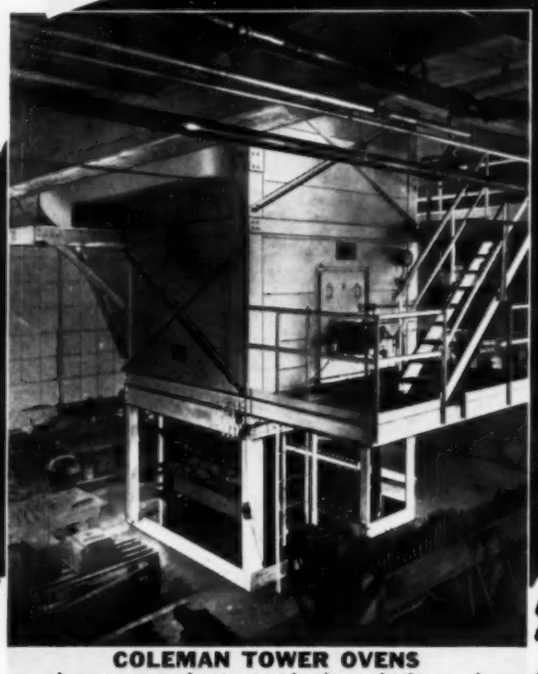
DAVENPORT MACHINE & FOUNDRY COMPANY

Davenport, Iowa, U. S. A.

Thousands of COLEMAN OVENS

COLEMAN TRANSRACK CORE OVENS
Most popular all-purpose type of core oven.
Wide range of standard sizes.

COLEMAN CAR TYPE CORE OVENS
For all classes of heavy and medium cores.



COLEMAN TOWER OVENS
Amazing production with these high-speed continuous ovens.

COLEMAN ROLLING DRAWER CORE OVENS
Wide range of sizes for high speed baking of medium and small cores.

COLEMAN

Built by **THE FOUNDRY**

Behind Our Armed Forces!

A SALUTE TO YOU...
Mr. Foundryman!

● For the splendid job you are doing in keeping pace with the ever-increasing demand for more and better castings in the all-out war effort—full credit to you!

Your foundry, whether it be large or small, has an important part in the production of aircraft, ships, guns, tanks or the essential tools and machines of industry in which castings play so vital a roll.

The fact that so many Coleman Core and Mold Ovens are now helping to speed production programs in foundries throughout the country is gratifying evidence of the nation-wide confidence in our equipment.

THE FOUNDRY EQUIPMENT CO.
BUILDERS OF COLEMAN AND SWARTWOUT OVENS
CONTRACTING ENGINEERS AND MANUFACTURERS
CLEVELAND, OHIO

Over 36 Years' Experience
..
Over 6,000 Installations

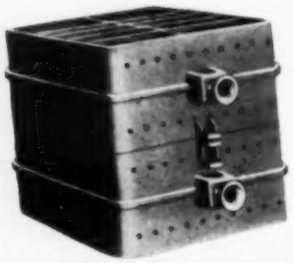
CORE and MOLD OVENS

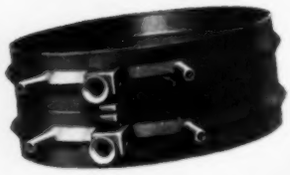
EQUIPMENT CO., Cleveland, O.

STRONG *but* LIGHT

Plus many Practical Features...

PREFERRED BY OVER 3500 FOUNDRIES





Many sizes, styles and shapes . . . every flask made from special rolled steel section, all-welded construction, for maximum strength and minimum weight.

● With today's strenuous demands on all foundry operations, it is fortunate that STERLING standards of quality in FLASKS were established long ago and have *proved* their practical combination of maximum STRENGTH with minimum WEIGHT. Solid construction, all-welded, rolled copper-bearing steel, with reinforcing ribs and square flanges, full-width bearing and other features make STERLING Flasks perform most efficiently, at lower cost, for longer service life. You can depend upon STERLING to maintain these sound standards . . . that's why these are the preferred flasks in more than 3500 foundries. Full range of sizes, styles and types . . . consult STERLING.

Integral ribs and flanges... all-welded construction; solid center reinforcing rib; square flanges; full-width bearing; simplifying accuracy and speed in molding; easy to ram, easy to shake out. (Patent No. 1974292)

Sterling FOUNDRY FLASKS

STERLING WHEELBARROW COMPANY
Milwaukee • Wisconsin • U • S • A

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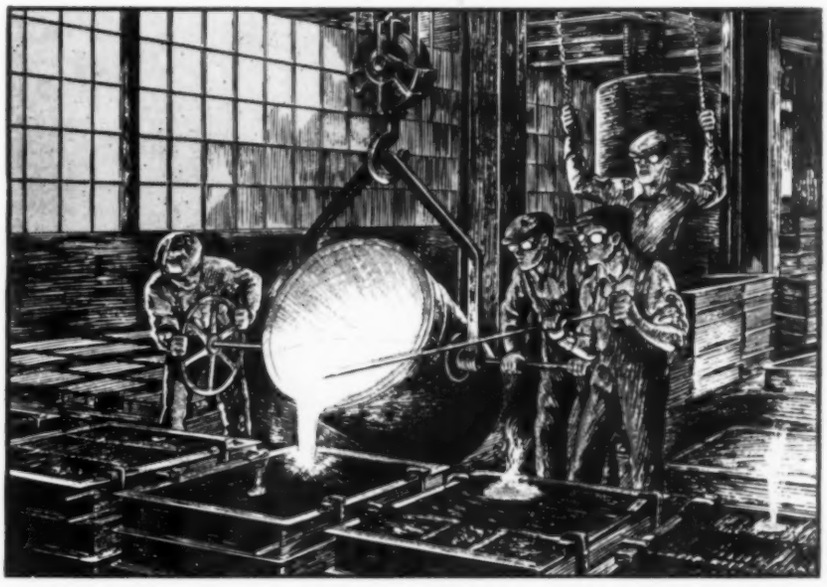

CLEARFIELD

A LINE OF SAND CONDITIONING
MACHINES DESIGNED AND
BUILT BY FOUNDRYMEN
FOR FOUNDRYMEN.

Our Seventy-fifth Anniversary Catalog
is just off the press

MAY WE SEND YOUR COPY?

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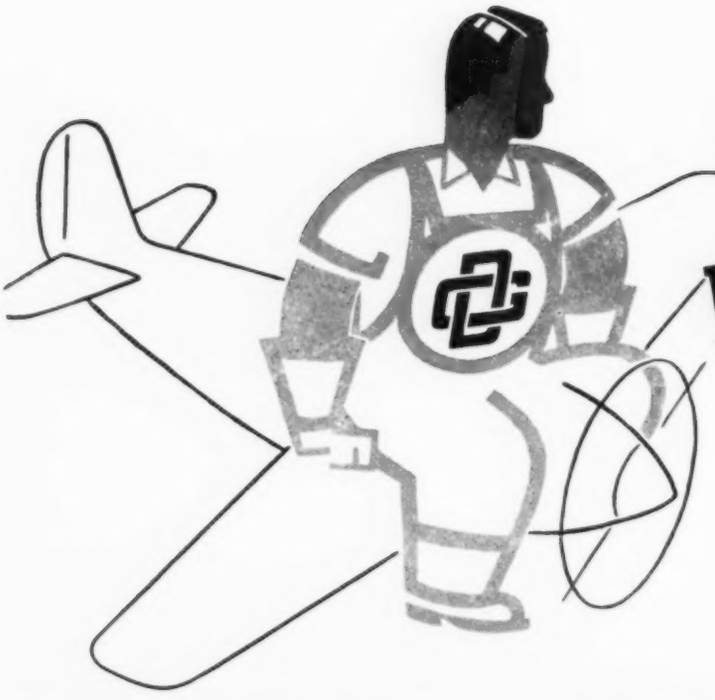
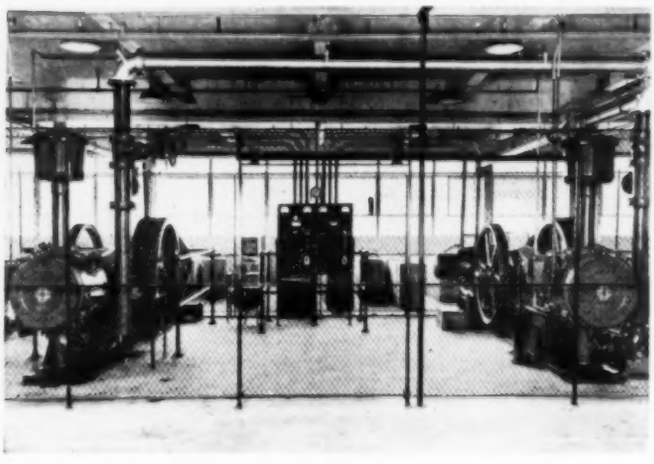
MACHINE COMPANY

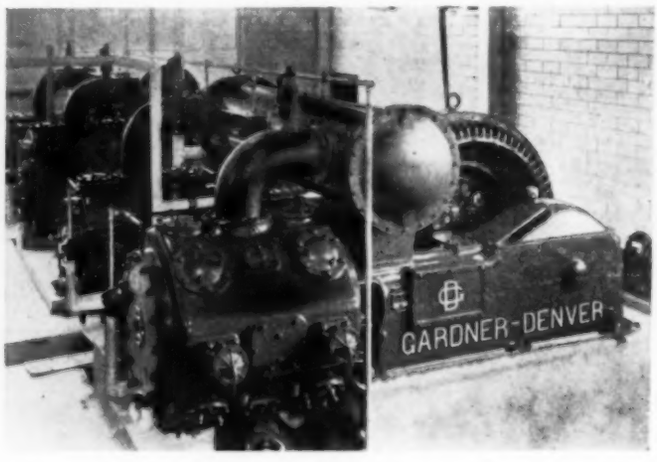
CLEARFIELD
PENNSYLVANIA, U. S. A.



UP YOUR AIR TO UP PRODUCTION

There's a bigger job for compressed air in your plant today and tomorrow. Are you using compressed air power to the full? Do your present compressors have the capacity—the efficiency that modern production demands? Here are two Gardner-Denver Compressors that can step up your air capacity at a lower cost per cubic foot of air delivered.





1— DESIGNED FOR UNUSUALLY LOW HORSEPOWER REQUIREMENTS — GARDNER-DENVER "RX" SINGLE-STAGE HORIZONTAL AIR COMPRESSORS

- Long years of service assured by rugged, dirt-free construction.
- Extra efficiency due to liberal and unrestricted valve and port areas.
- "Air-Cushioned" Duo-Plate valves actually become tighter with use.
- Built in capacities from 89 to 1292 cubic feet displacement per minute.

2— ENGINEERED FOR CONTINUOUS HEAVY-DUTY PERFORMANCE — THE GARDNER-DENVER "HA" TWO-STAGE HORIZONTAL AIR COMPRESSOR

- High overall efficiency assured by unrestricted air passages and large valve areas.
- A cooler running compressor assured by extra large water jacket areas.
- "Air-Cushioned" Duo-Plate valves decrease noise and wear—virtually eliminate valve breakage.
- Capacities range from 468 to 1854 cubic feet displacement per minute.

Write for complete information on the extra performance of Gardner-Denver "HA" and "RX" Horizontal Air Compressors. Gardner-Denver Company, Quincy, Illinois.

GARDNER-DENVER PRODUCTS KEEP SPEED TO VICTORY

GARDNER-DENVER *Since 1859*

Time is the only thing we haven't much of!

Another Royer for Chapman Valve Co., Indian Orchard, Mass. A Model "NRS", recently installed, provides "6 point" conditioning to mulled sand in their modern foundry. They purchased a Model "NRS" in 1940 and a portable Model "NB-4" in 1941 — three in all. Repeat orders reflect satisfaction!

War production requires a lot of castings as fast as they can be made. Every one counts. Scrap losses hinder our war production and directly affect your pocketbook. Properly conditioned sand is the best protection against faulty molds. You can be sure of your sand if it has had "6 point" preparation in a Royer Sand Separator and Blender. No other mechanical device can duplicate the exclusive "combing belt" action of this machine. Its cascading, raking, riddling action gives you:

- ★ Refuse removal—gaggers, burned cores, tramp iron can't get by the sweep.
- ★ Lump breaking—hundreds of steel fingers go to work on lumps and clay balls.
- ★ Thorough tempering and mixing—Royers are not clogged by moist sand.
- ★ Moisture evenly distributed through the heap.
- ★ Increased permeability—gas escapes better.
- ★ Double aeration—once on the belt and once as it is being discharged.

We have the materials and manpower, but *time for making good castings is short*—don't waste it on discount. The Royer rapidly conditions facing, backing and core sand—once through. Over 3,600 Royers in use. Eight stationary and portable models for ferrous and nonferrous jobbing shops, 5 to 50 tons. Stationary units for inclusion in the sand conditioning circuit of production foundries. Combination scrap remover—sand separator and blender units with hopper, lifted by crane from floor to floor, for medium and large steel jobbing foundries.

Let the Royer representative give you "production counsel."

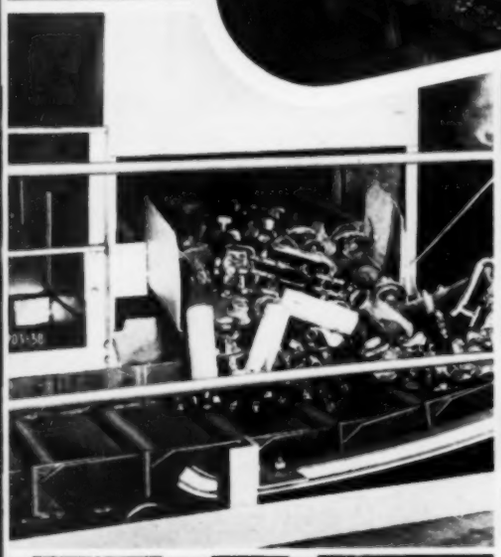
Royer Foundry & Machine Co.

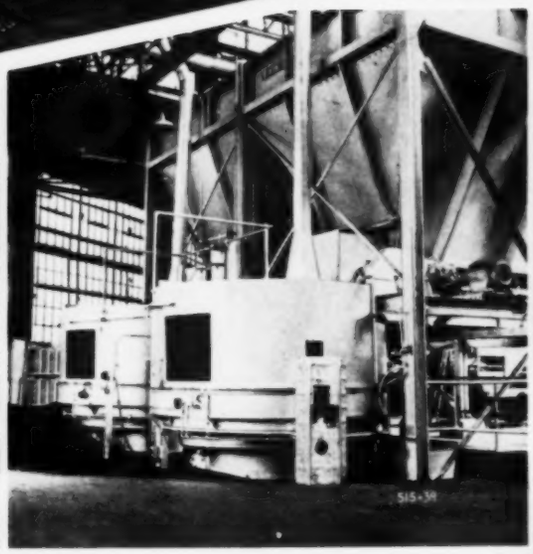
159 Pringle St., Kingston, Pa.

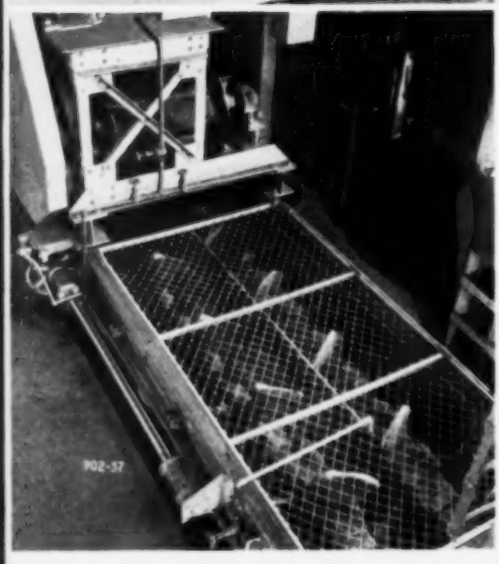
THE ROYER

ROYER FOUNDRY & MACHINE CO. KINGSTON, PA.

INCREASE





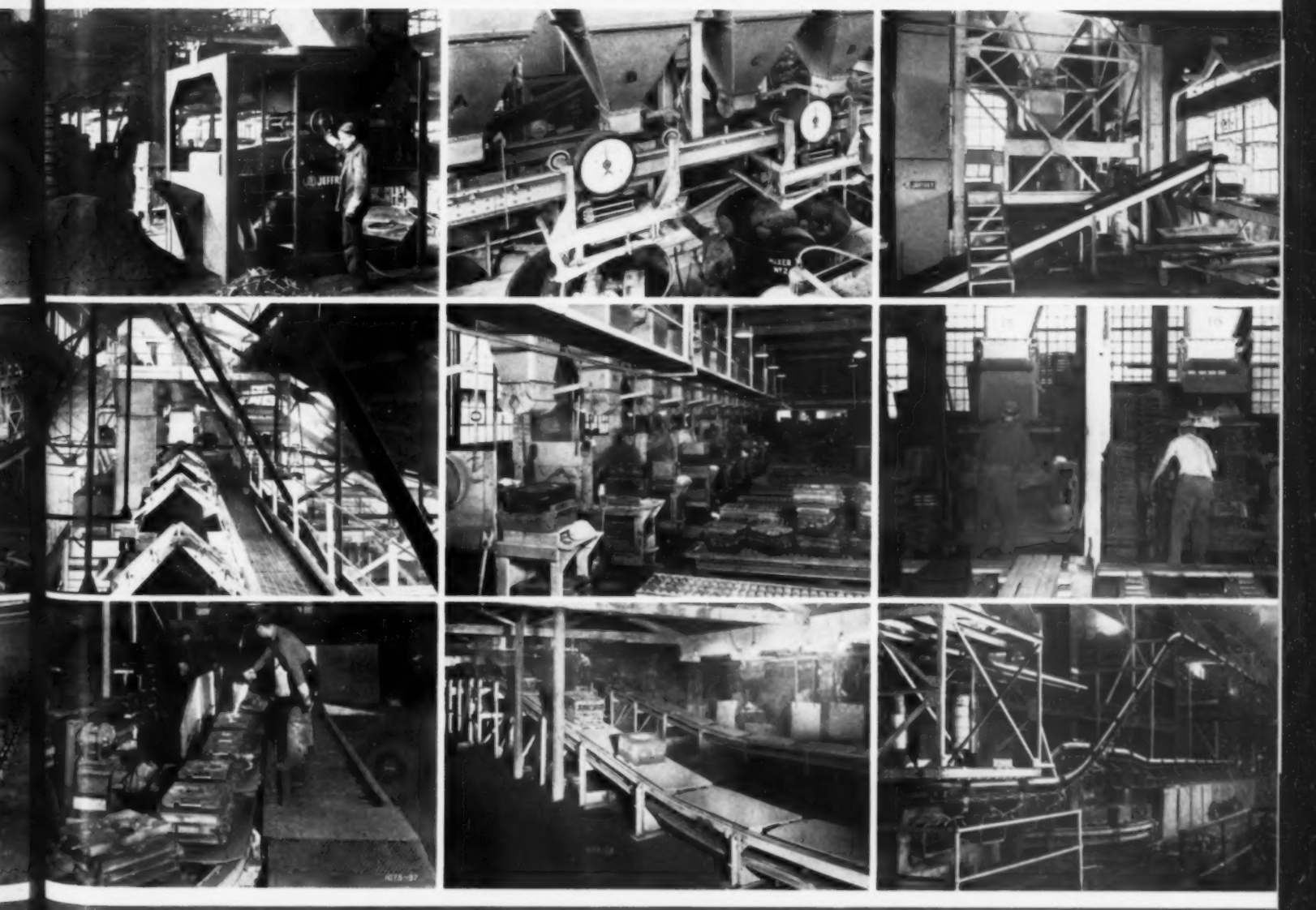


PRODUCTION EFFICIENCY

USE Jeffrey

FOUNDRY EQUIPMENT

Without modern material handling methods, production of war material for both the army and navy, would be at low ebb. The first line of both defense and offense is a fast-moving production line. "Now in Production" must be our by-word in these critical times. From the complete Jeffrey line covering every phase of material handling and sand conditioning (see illustrations) it is easy to select just the right unit or units for that particular set-up in your foundry. Avail yourself of the free service of a Jeffrey foundry engineer.



THE JEFFREY MANUFACTURING COMPANY

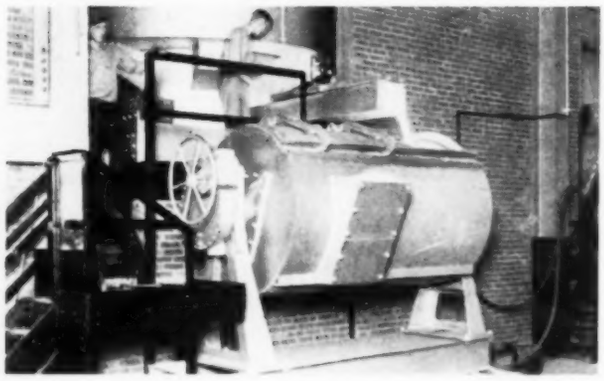
907-99 NORTH FOURTH STREET • COLUMBUS, OHIO

Ready to ship.. NOW!

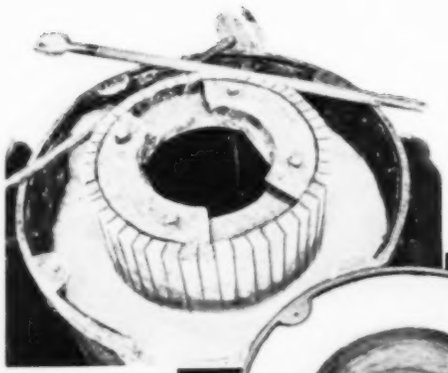
SPECIAL REFRACTORIES FOR FOUNDRIES

EASY TO WORK ✓
LONG LIVED ✓
LOW NET COST ✓
OUTSTANDING ENGINEERING PROPERTIES ✓

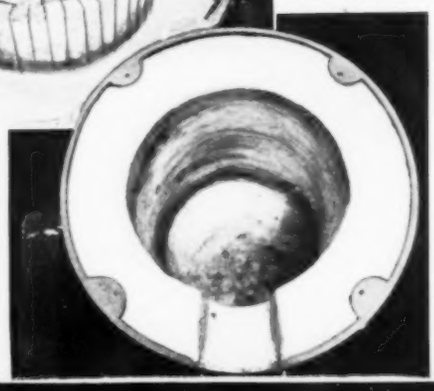
Increase Capacity and Improve Operation



(ABOVE)
6 ton mixer ladle lined with Super Ramtite Cover lined with Fractocrete



(BELOW)
Special Super Ramtite is recommended for brass and bronze melting furnaces



Bulletin Ready to Mail Now

TODAY our special refractories are being used with marked success in gray iron, steel, malleable and non-ferrous foundries . . . because of the eminent suitability of their exceptional combination of engineering characteristics.

The bulletin illustrated below describes each of these products in detail; outlines their various applications in aluminum, brass, gray iron, malleable and steel foundries and gives instructions for proper installation.

SEND NOW FOR A COPY WITHOUT OBLIGATION

THE RAMTITE CO. 1803 So. Rockwell St.
DIVISION OF THE S. OBERMAYER CO. CHICAGO, ILL.

ROTO DRAWER

GAS FIRED CORE OVEN

A STANDARD UNIT DELIVERED COMPLETE

TEMPERATURE CONTROL

The automatic control of the temperature of rapidly circulated and recirculated air insures a steady flow of cores perfectly baked in the shortest possible time.

SMOOTH DRAWER OPERATION

The drawers, being entirely supported by externally mounted bearings, operate so easily and smoothly that all possibility of broken cores is eliminated.

DRAWER CAPACITIES

The three large drawers are 8′-0″ diameter and have a capacity of over 1500# of cores 14″ high. The smaller removable drawers are over 4′-0″ diameter.

THE CLEVELAND BLOW PIPE & MFG. CO.

6505 CEDAR AVE. **CLEVELAND, OHIO**

MAGNESIUM *Melting*

Past

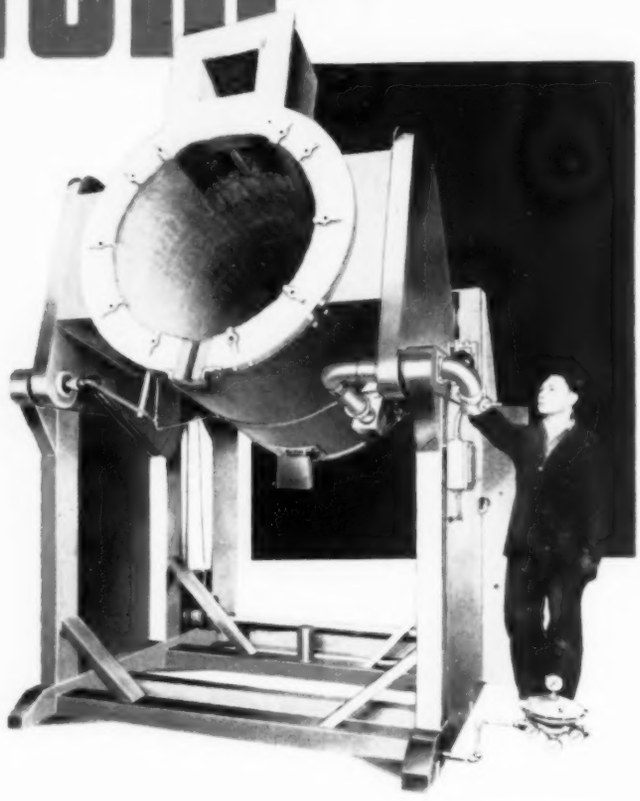
A few years ago Magnesium was only a laboratory metal.

Present

Approximately 50,000,000 pounds of Magnesium were commercially produced in 1941.

Future

Published estimates indicate plans for an immediate expansion of Magnesium production to 725,000,000 pounds annually.

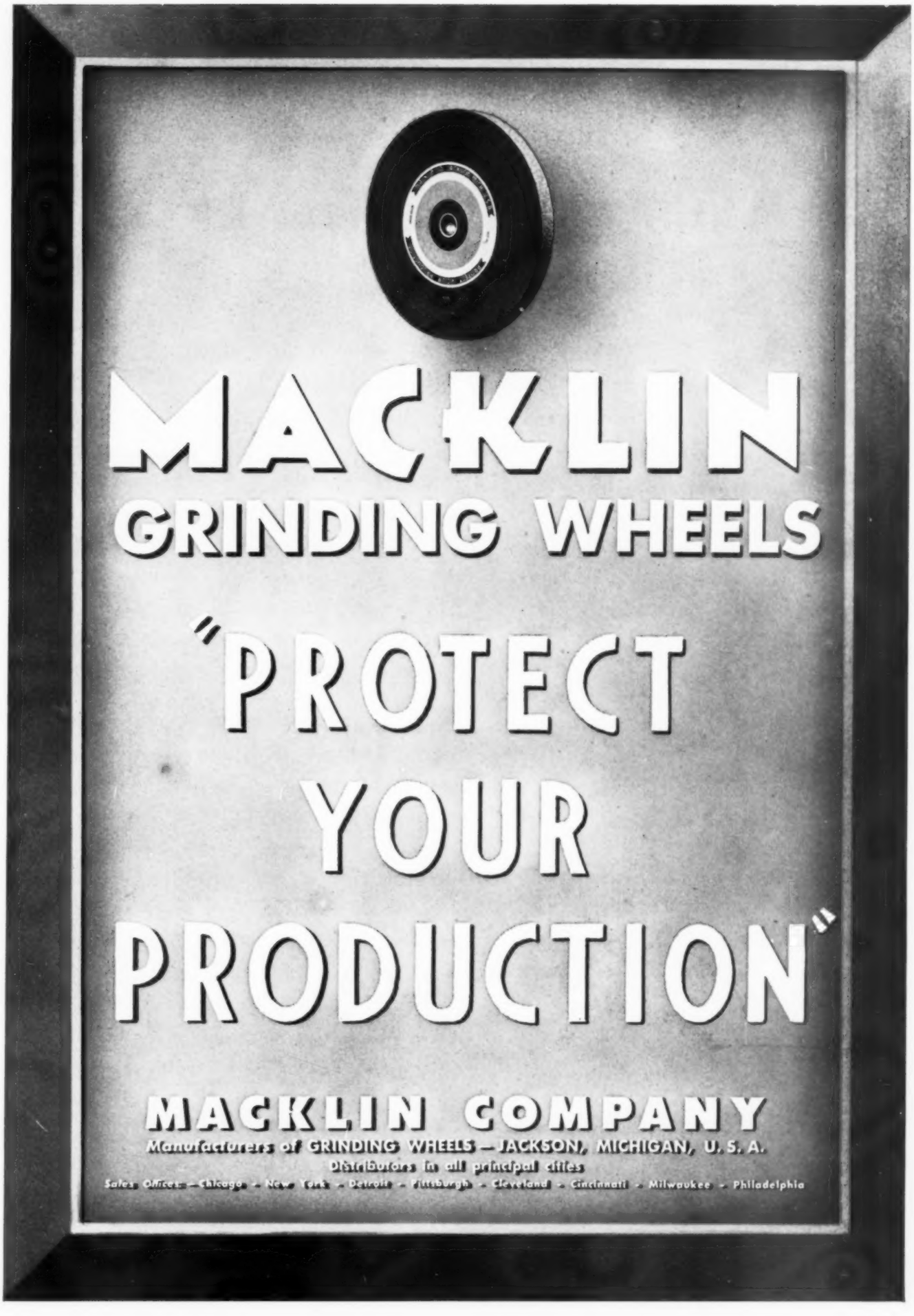


THIS large motorized nose pour melting furnace, with a capacity of 1700 pounds in magnesium alloys, excellently demonstrates Fisher's ability to fully meet today's equipment needs of magnesium melters. Fisher is playing an important part in this branch of our war production and is enlisting a wealth of experience in melting room equipment designing and building, melting room layout, and plant and equipment coordination preparatory to fully meeting future magnesium demands. The Fisher Line also includes a wide range of gas and oil fired Crucible Melting Furnaces (stationary, manually operated tilting types and motorized units), Iron Pot Melting Furnaces, Aluminum Melting Furnaces, Combination Blower and Oil Pump Systems, Centrifugal Blowers, Burners, Metering Valves, Blast Gates, etc.

Have you received your copy of "Fisher Products for the Foundry"?

1742 NORTH KOLMAR AVE., CHICAGO, ILLINOIS

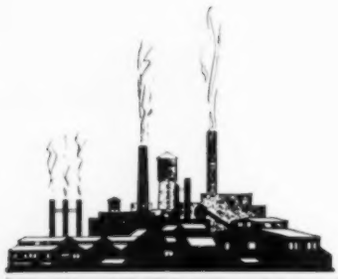
Fisher FURNACE COMPANY


MACKLIN
GRINDING WHEELS
"PROTECT
YOUR
PRODUCTION"
MACKLIN COMPANY
Manufacturers of GRINDING WHEELS — JACKSON, MICHIGAN, U. S. A.
Distributors in all principal cities
Sales Offices — Chicago - New York - Detroit - Pittsburgh - Cleveland - Cincinnati - Milwaukee - Philadelphia

We are making a real all-out effort

IT is hardly necessary for us to tell our customers that it is becoming increasingly difficult to fill their orders as promptly as we should wish. The effects of the complex influences at work in the war production program are now well understood. Our products and the materials from which they are manufactured are on the critical lists, and are subject to priority control with its unavoidable delays and disappointments.

You can be assured however that our entire organization is making a supreme effort to meet the difficulties as they arise, exerting every facility to meet your needs. We want to emphasize the point that your orders today are as carefully handled as they were during those days of recent memory when our big problem was not how to meet the demand but how to keep our men employed and best occupy plant facilities.



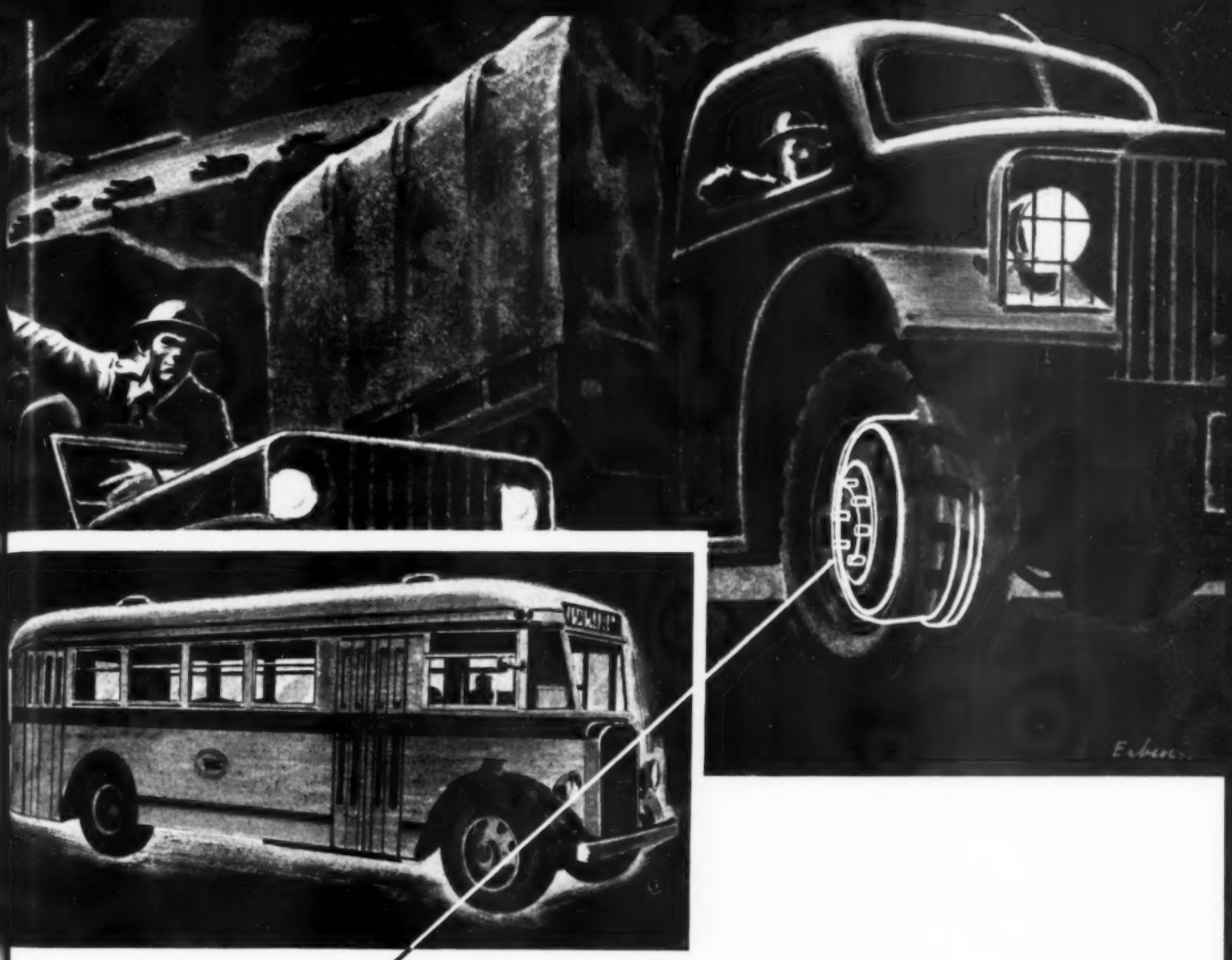
WORTHINGTON EQUIPMENT
for
POWER GENERATION
and
INDUSTRIAL SERVICE

STEAM TURBO-GENERATOR UNITS
MULTI-STAGE STEAM TURBINES
SINGLE-STAGE STEAM TURBINES
COMBINED STEAM TURBINE AND REDUCING GEAR UNITS
REDUCING AND INCREASING GEARS
DIESEL ENGINES
GAS ENGINES
CONVERTIBLE GAS-DIESEL ENGINES
STEAM CONDENSERS
STEAM JET EJECTORS
CENTRIFUGAL BOILER FEED PUMPS
CENTRIFUGAL GENERAL SERVICE PUMPS
AIR AND GAS COMPRESSORS
FEEDWATER HEATERS AND DE-AERATORS
WATER FILTERS
WATER SOFTENERS
REFRIGERATION AND AIR CONDITIONING EQUIPMENT
TURBINE WELL PUMPS
STEAM, POWER AND ROTARY PUMPS
LIQUID METERS
V-BELT DRIVES
PORTABLE AIR COMPRESSORS
CONSTRUCTION AIR TOOLS

WORTHINGTON

M12-S

WORTHINGTON PUMP & MACHINERY CORPORATION • GENERAL OFFICES: HARRISON, N. J.



276,103 MILES ON ONE SET OF MOLYBDENUM-VANADIUM BRAKE DRUMS

One of the outstanding contributions to Wear and Heat Resistance in cast iron has been the development of various molybdenum-vanadium irons. Some of these irons have been in service for a number of years, and several long and remarkable performances are beginning to be written into the record.

One of these is the case of a set of brake drums installed on a Chicago & Calumet District Transit Company bus. These drums were applied on April 23, 1937 and were in service continuously for four years, finally being removed on May 2, 1941.

In this time, the bus had travelled 276,103 miles under conditions of heat and cold, road-shock and stopping, that are severe tests for any set of brake drums.

Under comparable conditions, unalloyed drums usually give an average of about 50,000 miles of service. Only in isolated cases is a life of 75,000 or 100,000 miles achieved.

The record-smashing molybdenum-vanadium drums were cast from iron of the composition shown below.

Total carbon	3.38%
Silicon	1.81
Manganese	0.71
Molybdenum	0.55
Vanadium	0.16

In this application, it may be pointed out that the vanadium, while distinctly a stable carbide forming element, here functions primarily as a toughening rather than a hardening agent. In all such applications, the proportion of vanadium relative to other components is determined by the combination of properties required—such as Strength and Wear Resistance, or Strength and Resistance to both Heat Shock and Wear.

The drums in this case were cast by Frank Foundries, of Moline, Illinois and supplied to the Chicago & Calumet District Transit Co. by Standard Spring Co. of Chicago.

VANADIUM

RPORATION OF AMERICA · NEW YORK, N. Y.

FERRO-ALLOYS

DELTA

DELTA PARTEX . . . NUT SHELL PARTING

The modern scientific Lycopodium replacement. Absolutely safe and non-hazardous. It is economical . . . costs only a fraction of the cost of Lycopodium. The most efficient parting available . . . insures better core and mold surfaces.

DELTA NO-VEIN COMPOUND

Another distinct contribution of Delta Research Laboratories to the Foundry Industry. A specially compounded series of oxides . . . developed and tested for hot strength with the use of the Dilatometer . . . and proven in actual practice, for over two years, in many of the nations leading foundries. NO-VEIN COMPOUND eliminates veining . . . cuts cleaning room costs . . . insures improved casting surfaces.

DELTA OIL PRODUCTS CO.

RIGHT NOW when the combined facilities of industry are being used to capacity in the defense of our nation . . . when supplies of certain essential materials are difficult to obtain . . . or cut off entirely . . . the need for RESOURCEFULNESS is paramount. Substitutes must be found . . . methods and means to speed production must be developed and perfected. The utter importance of RESEARCH in FOUNDRY PRACTICES is, today, recognized and accredited and the competent, comprehensive facilities of DELTA RESEARCH LABORATORIES are playing an increasingly VITAL PART.

PRODUCTS FOR THE FOUNDRY

DELTA CORE AND MOLD WASHES

GRAKOAT . . STEELKOAT . . Z-KOAT . . BLACKOAT

All Delta mold washes are Dilatometer proven for hot strength to insure positive adherence to core and mold surfaces. They produce high fusion surfaces which are highly refractory and absolutely moisture-proof. In use, these washes remain in suspension, eliminate gas formation, and are non-reactive in contact with molten metals.

Most economical to use . . . cut cleaning room costs . . . produce smoother surfaces and more perfect castings.

DELTA CORE OILS

Scientifically developed and laboratory tested . . . checked for high tensile strength and fast baking. All Delta core oils are compounded to meet the most exacting requirements in all phases of foundry core practice.

DELTA SPRAY BINDERS

A product of unusual value for green sand molds.
Produces, almost instantaneously, dry mold surfaces, thereby eliminating hours of oven or torch drying. Very easy and most economical to use.

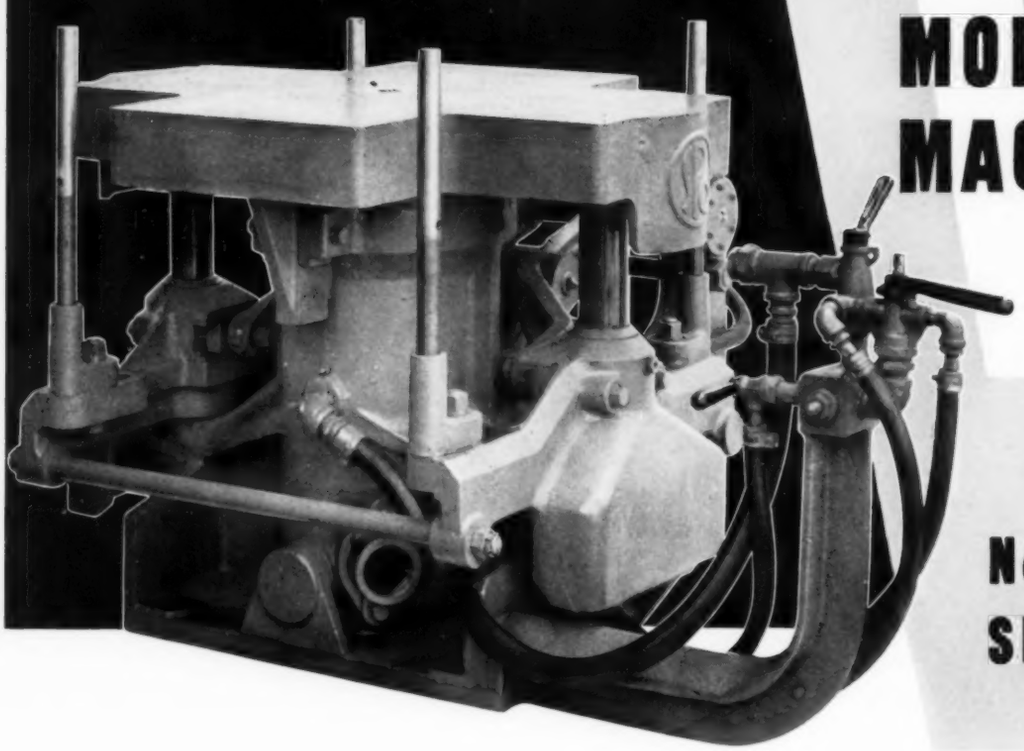
MANUFACTURERS OF INDUSTRIAL AND AUTOMOTIVE OILS, GREASES, AND COMPOUNDS

MILWAUKEE WISCONSIN

Do it Fast.. Do it Right..

WITH

SPO MOLDING MACHINES



THE No. 300 SERIES

STURDY • COMPACT • POWERFUL

SIMPLE. Design restricted to essentials; minimum working parts. Jolt blows regulated by simple adjustment. So is pattern draw. Very simple valve construction.

EFFICIENT. Smooth, accurate pattern draw. Slow at start, fast as mold leaves pattern. Powerful, rugged, with heavy jolting capacity. Economical.

FLEXIBLE. Accommodates wide variety of flask sizes and shapes. A profit-maker on jobs involving very few molds or long runs. A real "Handy Andy".

COMPACT. Very portable. All in one piece—no separate, sprawling valve mechanism to take up space and increase maintenance. No pit necessary.

The No. 300 Series is one of a complete line of modern molding machines designed by foundrymen for foundrymen. SPO also designs and builds pattern equipment. All equipment is guaranteed to be in full accordance with your specifications.

SPO

INCORPORATED

Manufacturers and Specialists in Molding Machines, Vibrators and Patterns for Production

7500 GRAND DIVISION AVENUE • • CLEVELAND, OHIO

Improve your Iron with ladle additions of "SMZ" ALLOY

BY adding small amounts of "SMZ" alloy to cast iron in the ladle, you can get a stronger, tougher iron of better machinability. This balanced alloy of silicon, manganese, and zirconium improves the structure of cast iron, thus improving its physical properties. It also lowers the depth of chill of cast iron, thus softening the iron at corners and in light sections and making it more machinable. The graphs at the right show how "SMZ" alloy raised the tensile strength, the transverse strength, and the deflection, and decreased the depth of chill of the same base iron.

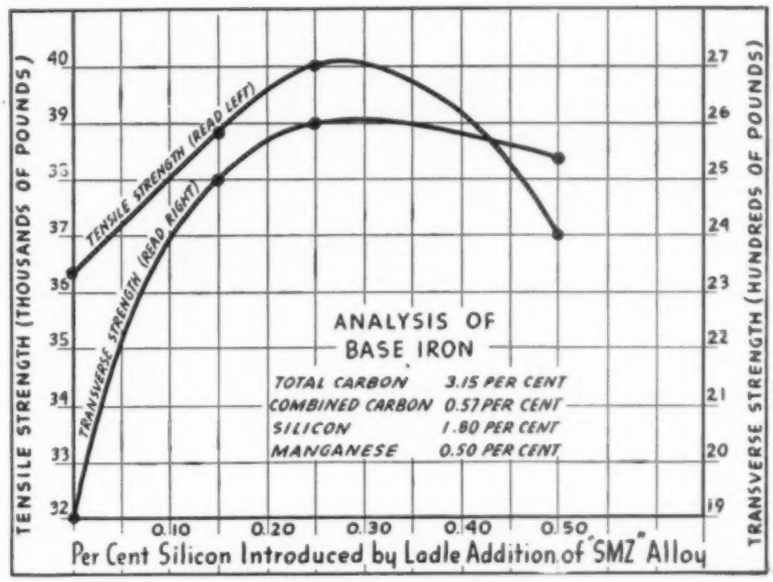
One of our metallurgists will gladly call at your request and tell you more about "SMZ" alloy and how it can improve *your* iron. He can tell you also about the many other "Electromet" ferro-alloys for the foundry and give you practical help in using them to obtain better iron, often at lower cost. This service is yours for the asking.

ELECTRO METALLURGICAL COMPANY
Unit of Union Carbide and Carbon Corporation

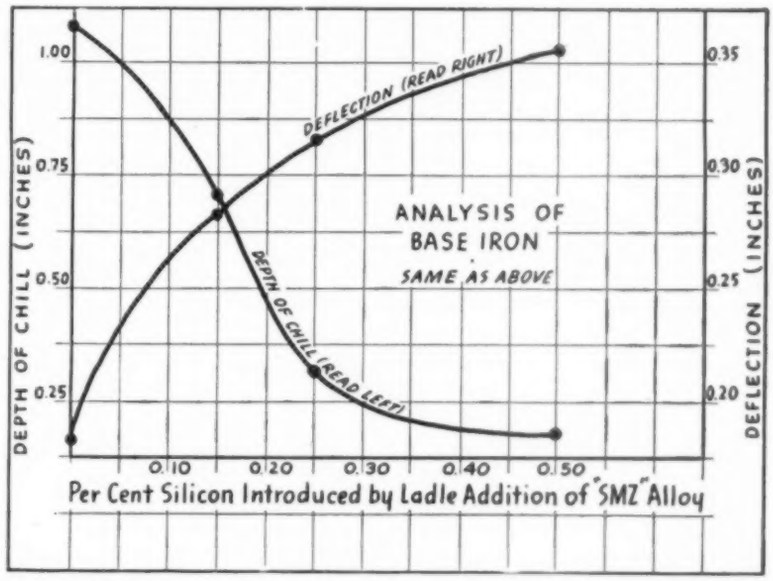
UCC

30 East 42nd Street, New York, N. Y.

The word "Electromet" and the letters "SMZ" are registered trade-marks of Electro Metallurgical Company.


TENSILE STRENGTH (THOUSANDS OF POUNDS)
TRANSVERSE STRENGTH (HUNDREDS OF POUNDS)
TENSILE STRENGTH (READ LEFT)
TRANSVERSE STRENGTH (READ RIGHT)
ANALYSIS OF BASE IRON
TOTAL CARBON 3.15 PER CENT
COMBINED CARBON 0.57 PER CENT
SILICON 1.80 PER CENT
MANGANESE 0.50 PER CENT
Per Cent Silicon Introduced by Ladle Addition of "SMZ" Alloy

Effect of Increasing Ladle Additions of "SMZ" Alloy on Tensile Strength and Transverse Strength of Cast Iron.


DEPTH OF CHILL (INCHES)
DEFLECTION (INCHES)
DEFLECTION (READ RIGHT)
DEPTH OF CHILL (READ LEFT)
ANALYSIS OF BASE IRON
SAME AS ABOVE
Per Cent Silicon Introduced by Ladle Addition of "SMZ" Alloy

Effect of Increasing Ladle Additions of "SMZ" Alloy on Deflection and Depth of Chill of Cast Iron.

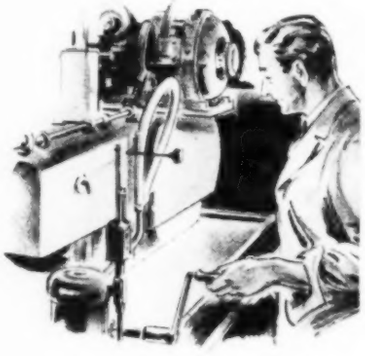
Electromet
Trade-Mark
Ferro-Alloys & Metals

Available through offices of Electro Metallurgical Sales Corporation in Birmingham, Chicago, Cleveland, Detroit, New York, Pittsburgh, and San Francisco. In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario.

The wheel that cuts tank armor like a sharp knife slices bread!

When steel men made tank armor that could withstand anti-tank fire, they put our army one up on the battlefield. But they posed a new problem in tank construction. Precision cutting of the armor plate is necessary at many places to insure contact for welding. But because of its toughness, ordinary mechanical cutting methods wouldn't do. What was the answer? With Carborundum Brand Cutting-Off Wheels, the 1-1/8" armor plate is now sliced like you'd slice a loaf of bread. And so accurately that mating parts fit perfectly.

These abrasive wheels have revolutionized cutting-off methods. Often of extreme thinness, they even perform such delicate operations as slotting the points of fountain pens! Today Carborundum-made Cutting-Off Wheels are used to cut plastics, glass, brick, tile, steel and non-ferrous metals in plate and bar stock ...faster, more safely, and more economically. In most cases further finishing is unnecessary.

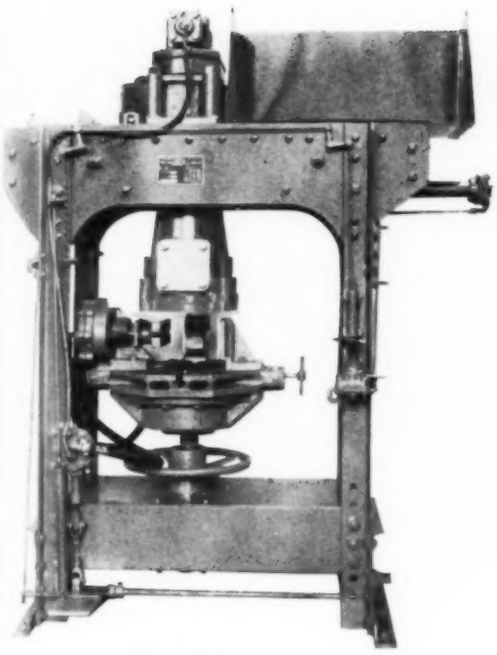


This is not the only "short cut" in which Carborundum has pioneered. Our research, plant facilities, and sales engineering have helped manufacturers reduce costs and speed production in many ways. Perhaps they can do as much for you. The Carborundum Company, Niagara Falls, New York.

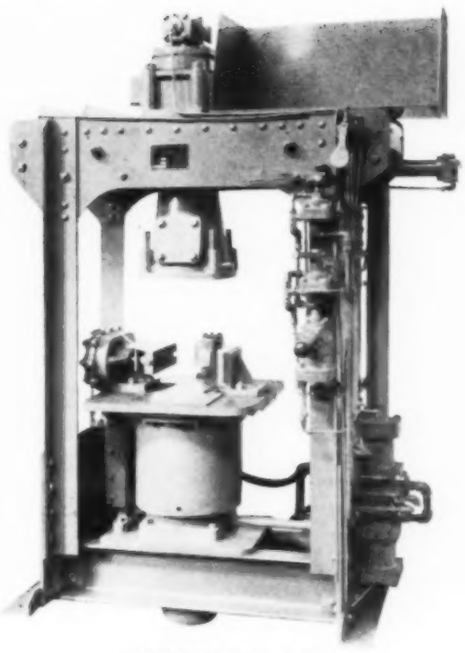
CARBORUNDUM
REG. U.S. PAT. OFF.
ABRASIVE PRODUCTS

Carborundum is a registered trademark of and indicates manufacture by The Carborundum Company

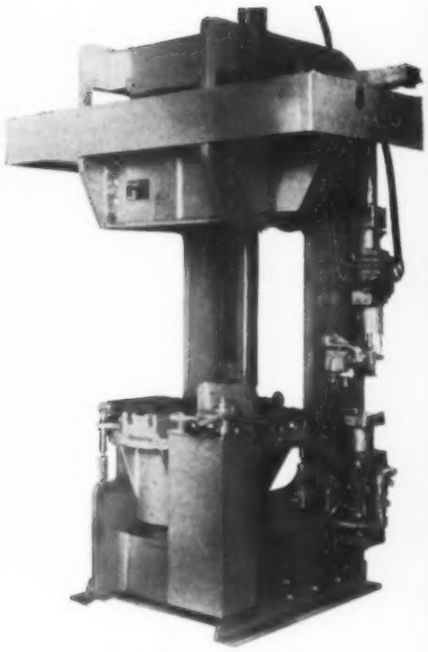
Core Blowers



DEMMLER No. 2



DEMMLER No. 3 E



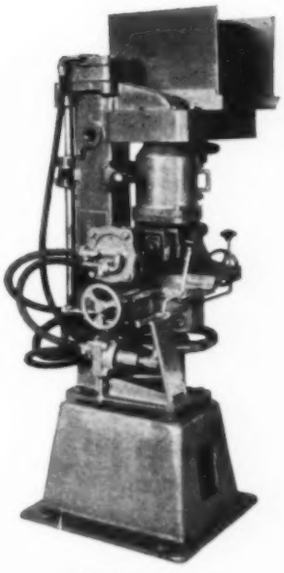
DEMMLER No. 8

30 years of specialization on this one problem—the blowing of cores—working with and for foundrymen, has given us knowledge and experience which is one of the many extra, guaranteed values obtained with the purchase of a DEMMLER core blower.

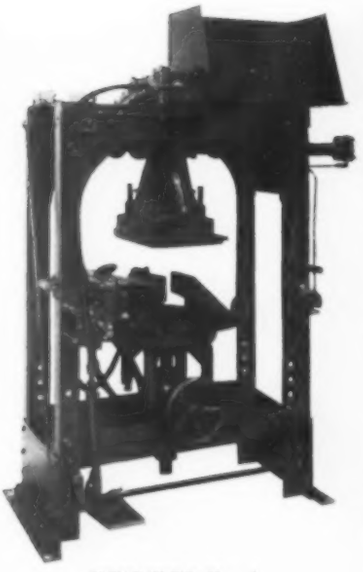
Hundreds of Demmler core blowers in constant use throughout the foundry industry. Available in 5 standard sizes (special types and sizes made to suit any unusual requirement).

Write for descriptive folders.

WM. DEMMLER & BROS.
KEWANEE, ILLINOIS



DEMMLER No. 0

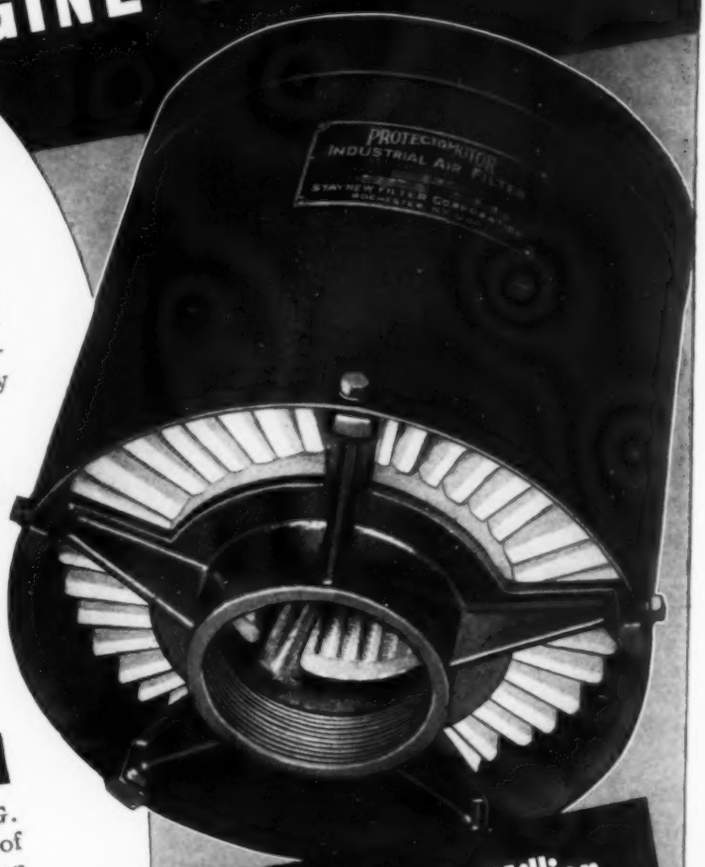


DEMMLER No. 1

DEMMLER

CORE BLOWERS *Exclusively*

WHY PROTECTOMOTOR AIR FILTERS ARE BEST FOR DIESEL ENGINE USE ★ ★ ★



★ HIGH EFFICIENCY WHEN INSTALLED

All Protectomotor Air Filters for internal combustion engines and compressors feature the exclusive, dry-type Feltex Filtering Medium. This medium passes air freely, yet restricts the passage of even microscopic dust particles. Used in the patented Radial Fin Construction, tests made by the University of California show it to possess an efficiency only .1% less than absolute.

★ INCREASED EFFICIENCY WITH USE

A limited amount of dust clings to the outside of the filter medium during use. This amount is limited by vibration transmitted from the engine, which shakes off most of the dust. The remainder acts as a filter, *increasing* efficiency with use instead of decreasing it, as in liquid-type filters.

★ LOW RESTRICTION TO AIR FLOW

Protectomotors used as rated offer *only* ½" *W. G. restriction to air flow*, yet after months or years of use this restriction will not increase to more than an inconsequential 1" W.G.—remaining at this point during the life of the filter—due to the Radial Fin Construction which permits the largest possible area of filtering surface to be used in the smallest possible space, plus the shaking action of engine vibration on the vertical fins.

★ SERVICING SELDOM NECESSARY

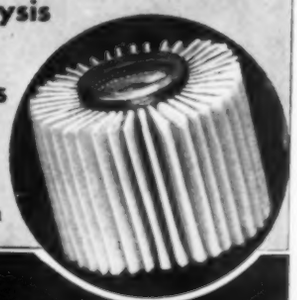
The Protectomotor is a masterpiece of simple, rugged construction. There are no moving parts, no reservoirs, no liquids. The only servicing ever required is the removal of the Insert for cleaning—perhaps once a year under average conditions. Cleaning can usually be effected in 5 or 10 minutes with compressed air or a stiff brush.

★ LONG LASTING ★ ★ ★

Massive, over-gauge materials are used throughout, corrosion proof wherever required, without moving parts to wear out or break; it is not surprising that many Protectomotors have been in continuous use for more than 10 years.

More than Half a Million Installations on Internal Combustion Engines and Compressors since 1920

Write for Catalog and Data Blank for Free Analysis of your Requirements



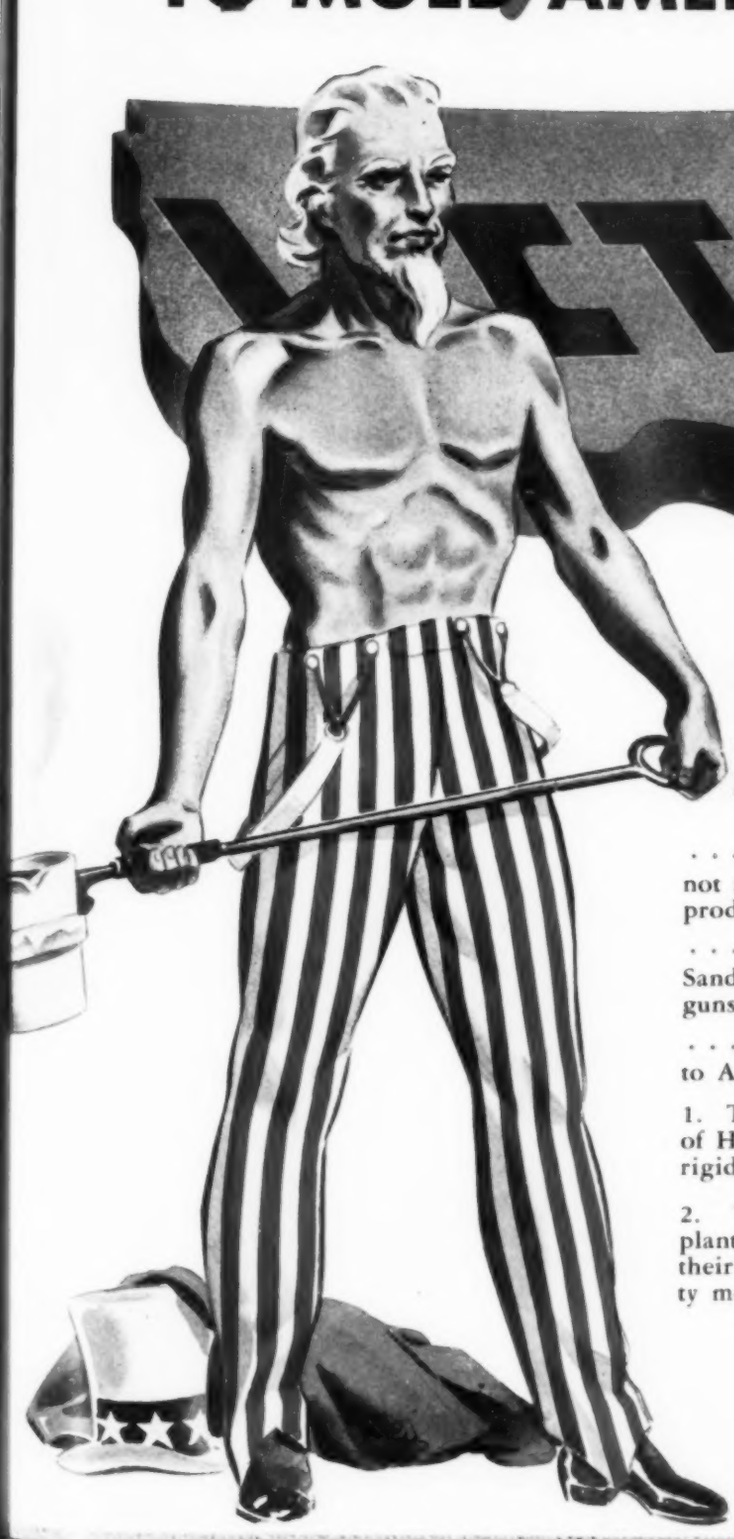
Radial Fin Construction

PROTECTOMOTOR AIR FILTERS — 99 9/10 Per Cent Efficient

STAYNEW FILTER CORP.
35 Centre Pk., Rochester, N. Y.
"Air Filter Headquarters"

Helping Uncle Sam

TO MOLD AMERICA'S VICTORY



H & H MOLDING SANDS

Prove Equal to the Task!

. . . . – This is a war of production! America's victory will be won—not alone in the field of battle—but in the FOUNDRIES and on the production lines.

. . . . – Hundreds of foundries are depending on H & H Molding Sands to speed up production of castings for airplanes, tanks, ships, guns, machine tools, anti-aircraft, bearings, bombs, trucks, etc.

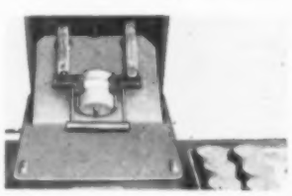
. . . . – Here's our twofold pledge to America's Foundries.

1. To preserve the high standards of H & H Molding Sands through rigid laboratory-control.

2. To keep our four processing plants working constantly to supply their ever-increasing needs for quality molding sands.

DELIVERY can be made of sands to meet your specifications. Any specified permeability, bond-content and strength. Over 100 grades, ranging from 25 to 288 grain fineness. Write today—tell us your requirements—or ask a representative to call.

H & H SINTERING TEST



Is the sintering point of your sand high enough to withstand the present day demand for high temperature metals? Many of our deposits have the highest sintering point of any natural sands in America. EVERY CAR TESTED!

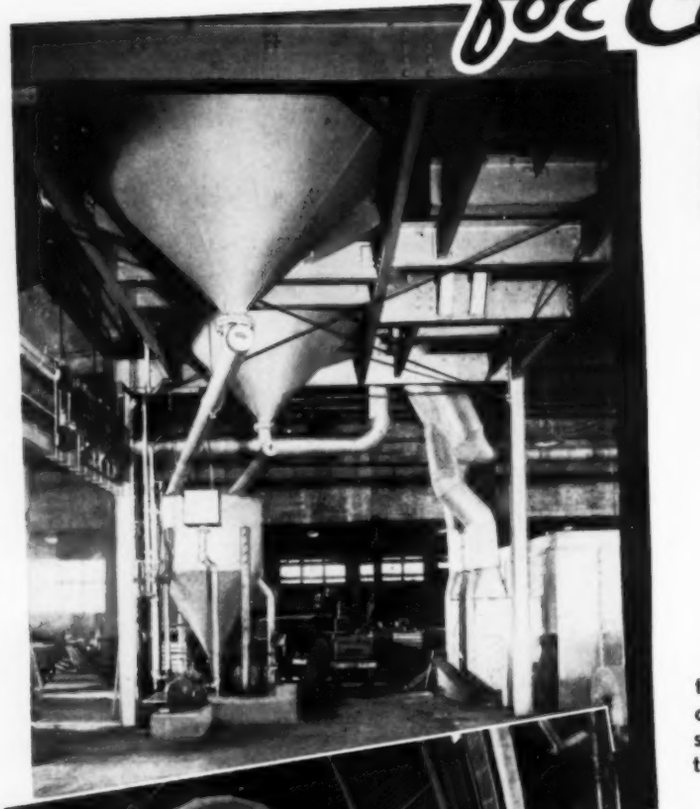
QUALITY SANDS ◇ SINCE 1910

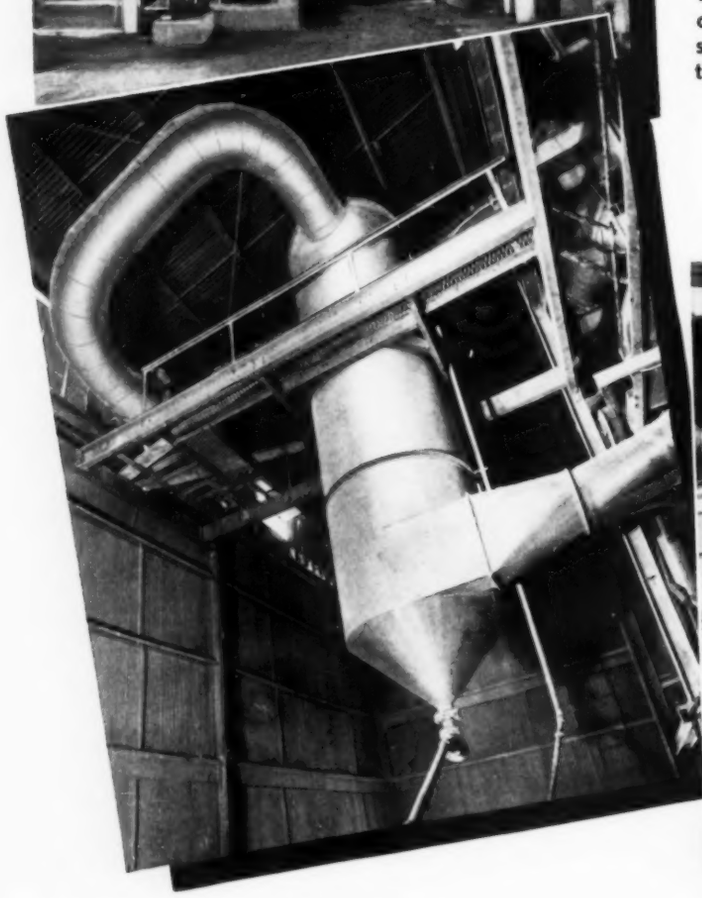
HOUGLAND & HARDY, Inc. ◇ HARDY SAND COMPANY

PRODUCING THE WORLD'S LARGEST VARIETY OF MOLDING SANDS

EVANSVILLE, INDIANA

Schneible is a "MUST" for Cleaning Rooms





Because of the large volume of dust created by today's high volume production, it's just good common sense to install Schneible Multi-Wash Dust Collectors. Schneible Collectors have these outstanding advantages over all other types:

No moving parts in the collector; fan is on the clean air side.

Uses water over and over to wash dust and fumes from the air; quenches sparks from grinding or hot shake-outs; eliminates abrasion; has no bags to burn, no filters or screens to clog.

Uniform low back-pressure with unvarying pipe velocity in the system at all times.

No spray nozzles to clog or other parts to get out of order; water is introduced at no head pressure.

High efficiency—simplicity of design and operation—low operating cost.

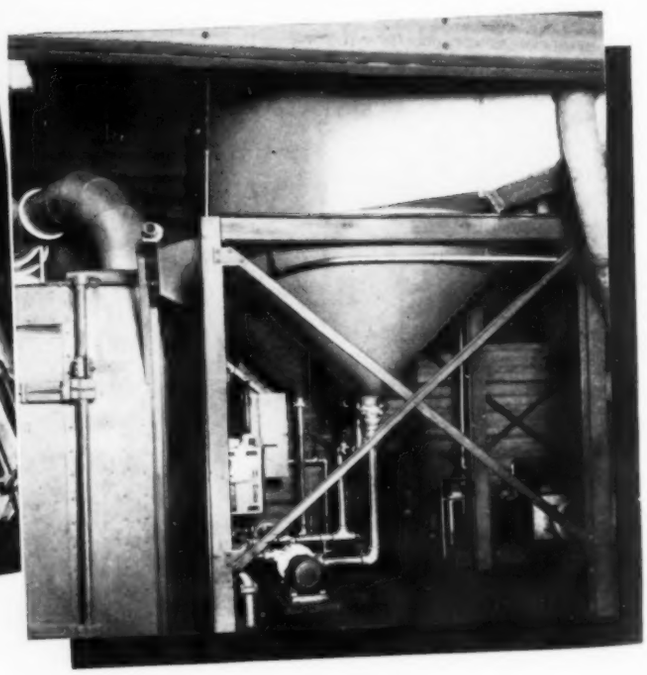
Clean air makes for less labor fatigue and greater production—install a Schneible now!

No other system of foundry ventilating can give you these features. A size and type for every foundry. Assures clean, fumeless air in cleaning rooms, at shake-outs, at sand conditioning, molding and other dust-creating operations. Get the facts—send for bulletins.

CLAUDE B. SCHNEIBLE CO.

3953 Lawrence Ave., Chicago, Ill.

Offices in Principal Cities



SCHNEIBLE

CLECO *Tools*

FOR THE FOUNDRY

FOR many important jobs in the foundry, there is a Cleco Tool to help meet the demand for faster, better production. Using Cleco grinders, chippers and sand rammers, your men will get their work done faster, with less air and less maintenance costs.

For the cleaning room, there are more than a score of different sizes and styles of Cleco Chipping Hammers—the *right* tool for every job. There is no trouble selecting a Cleco Rotary Grinder, either. To meet every requirement, these powerful, easily handled grinders are available in a dozen sizes and types.

Cleco Sand Rammers—for floor, flask, bench and core work—are nicely balanced, highly efficient tools that insure uniform mold density for quality castings.

Cleco Pneumatic Tools have served the foundry industry for over 40 years. Now that production is a key factor in America's Victory Program, Cleco Pneumatic Tools will help you more than ever before in meeting the nation's needs. The complete line includes chippers, grinders, rammers, drills, riveters, hose couplings and accessories.

ASK FOR THESE BULLETINS

Cleco Rotary Grinders—Bulletin 80
Cleco Chipping Hammers-Bulletin 75A
Cleco Sand Rammers—Bulletin 76A

All Cleco Tools available on free trial. No obligation.

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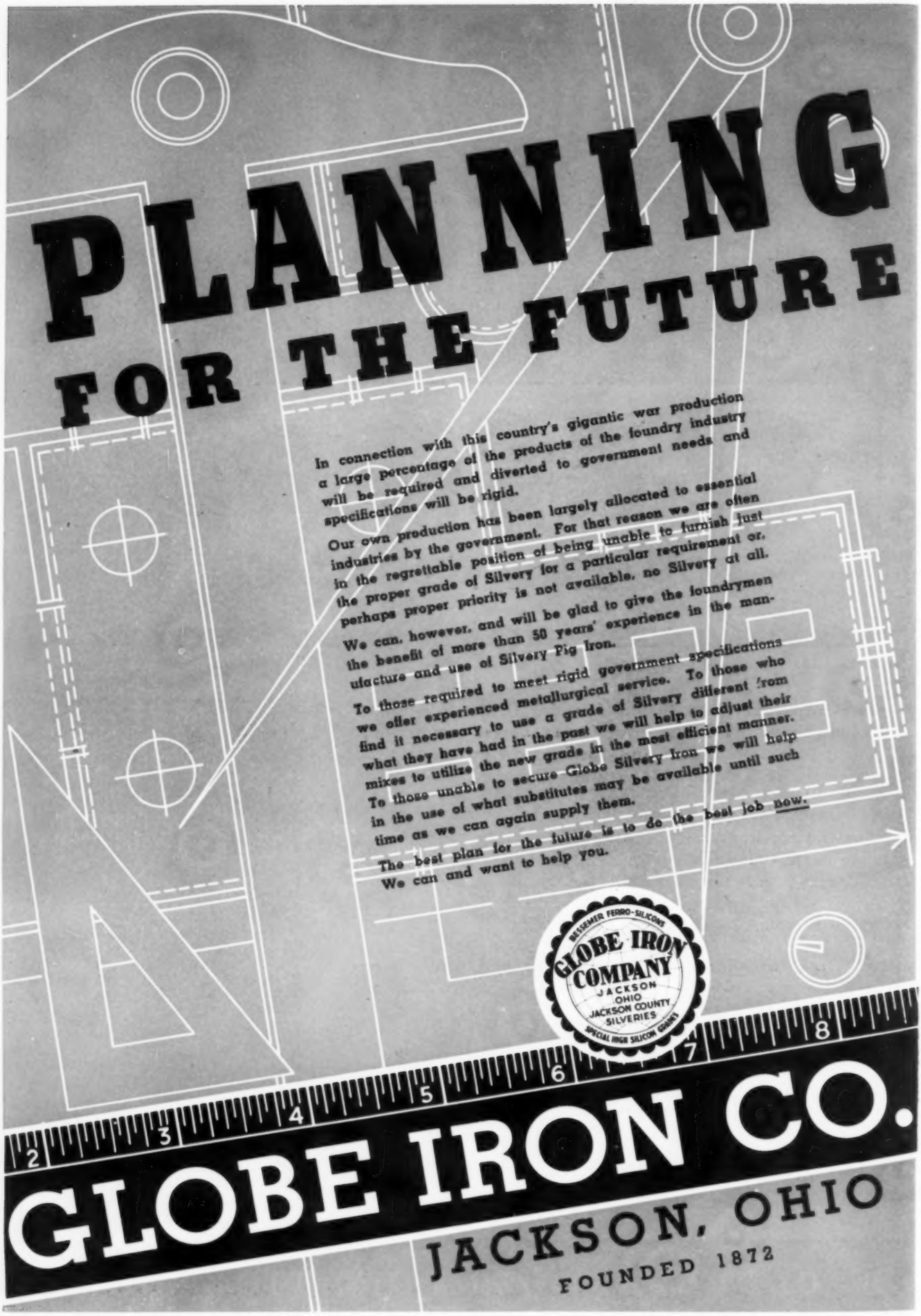
THE CLEVELAND PNEUMATIC TOOL CO.
3734 EAST 78th STREET **CLEVELAND, OHIO**

★


PLANNING
FOR THE FUTURE
In connection with this country's gigantic war production a large percentage of the products of the foundry industry will be required and diverted to government needs and specifications will be rigid.
Our own production has been largely allocated to essential industries by the government. For that reason we are often in the regrettable position of being unable to furnish just the proper grade of Silvery for a particular requirement or, perhaps proper priority is not available, no Silvery at all.
We can, however, and will be glad to give the foundrymen the benefit of more than 50 years' experience in the manufacture and use of Silvery Pig Iron.
To those required to meet rigid government specifications we offer experienced metallurgical service. To those who find it necessary to use a grade of Silvery different from what they have had in the past we will help to adjust their mixes to utilize the new grade in the most efficient manner.
To those unable to secure Globe Silvery Iron we will help in the use of what substitutes may be available until such time as we can again supply them.
The best plan for the future is to do the best job now.
We can and want to help you.
BESSEMER FERRO-SILICONS
GLOBE IRON COMPANY
JACKSON
OHIO
JACKSON COUNTY SILVERIES
SPECIAL HIGH SILICON GRADES
GLOBE IRON CO.
JACKSON, OHIO
FOUNDED 1872

ANNOUNCEMENT

to the

Foundry Industry

☆

THE "HAMMER" and "RAPID" core making machines formerly manufactured by American Foundry Equipment Company, Mishawaka, Indiana have been purchased by us and added to our present line.

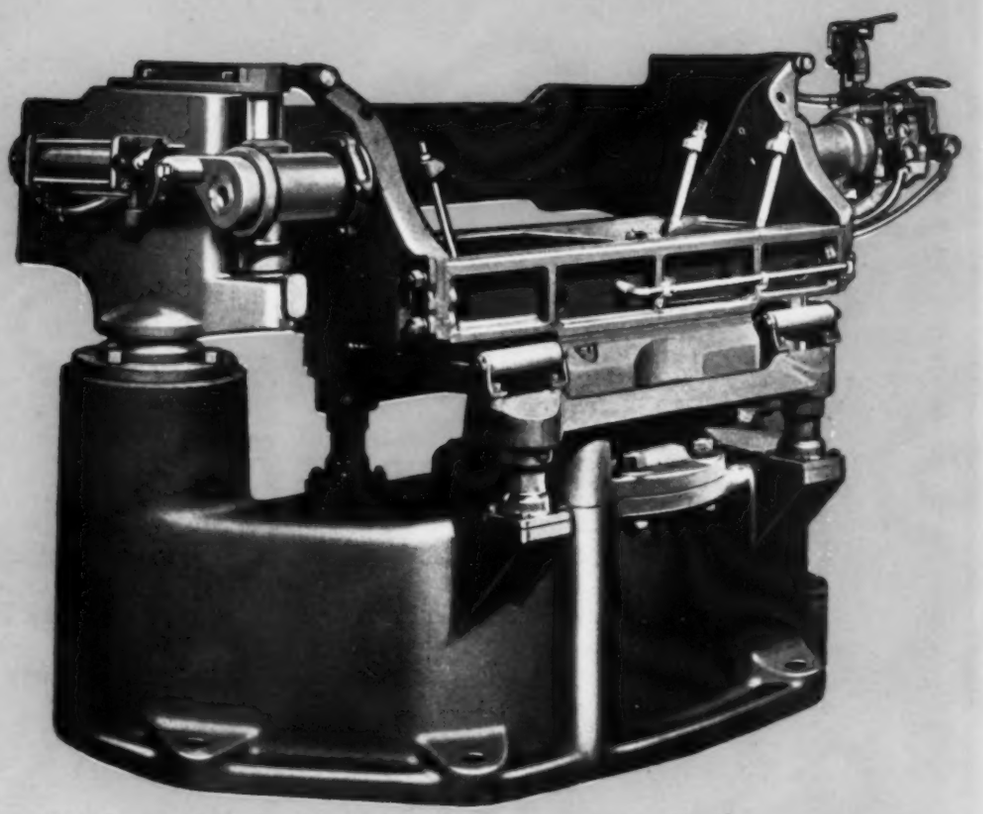
We will manufacture this equipment and carry new machines, repairs, and renewals in stock. We will continue at all times to give the same assistance and service that our company has maintained for the past forty years in manufacturing and selling Wadsworth Core making equipment, core cutting off, coning machines, and allied products. This line will be continued in addition to the "HAMMER" and "RAPID".

☆

WADSWORTH CORE MACHINE & EQUIPMENT CO.

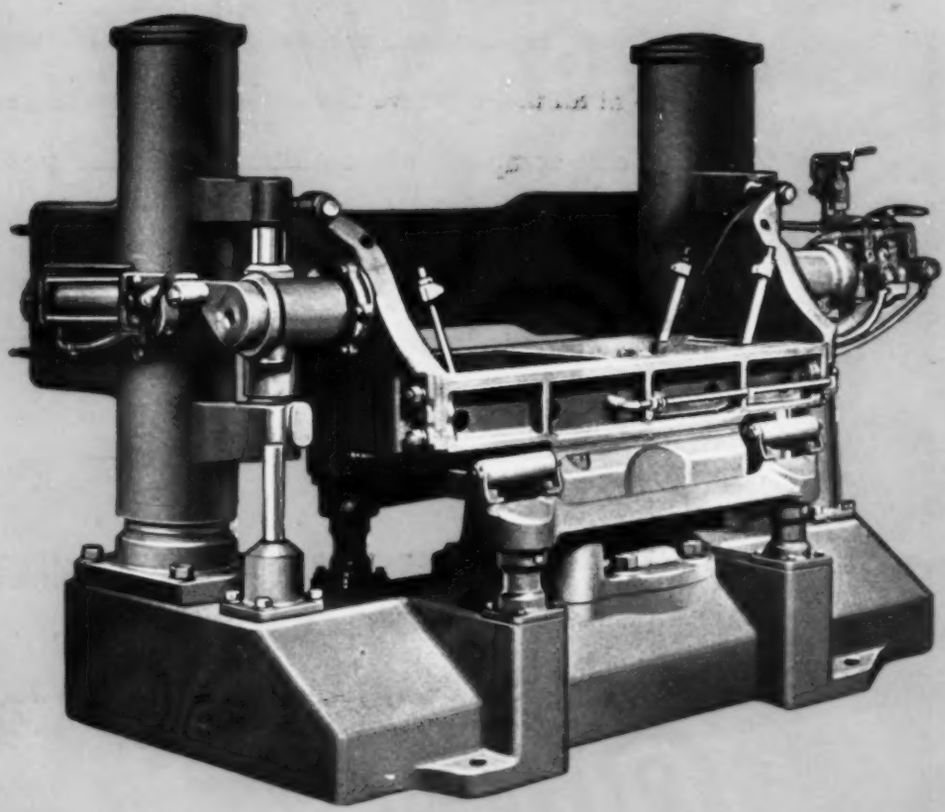
AKRON, OHIO

For Over 22 Years ... A COMPLETE LINE OF



MODELS B & D MILWAUKEE JOLT ROLLOVER DRAW

A compact, high-speed molding machine, engineered for today's peak demands of war-production, with automatic air clamps, power rollover, quick-acting pistons, and instantaneous hydraulic leveling. Draw Pistons are *below* floor line. Available with or without jolt.



MODELS A & C MILWAUKEE JOLT ROLLOVER DRAW

All features of construction and operation are identical to those of Models B & D (illustrated above) except that Models A and C have the Draw Pistons above the floor line. All these MILWAUKEE Jolt Rollover Draw machines are ideal for general molding and core-making.

MILWAUKEE

MANUFACTURERS OF MOLDING MACHINES AND BRIQUETTING PRESSES

MILWAUKEE MOLDERS

Designed • Built • Sold and Serviced BY EXPERIENCED FOUNDRYMEN

Proven . . . Like all molding equipment in the complete MILWAUKEE line, these two JOLT ROLLOVER DRAW machines were designed by experienced foundrymen to meet today's demands for high speed molders capable of handling a wide range of work. These modern molders are a modification of the famous MILWAUKEE JOLT SQUEEZE ROLLOVER DRAW machines which have PROVED their worth, on production lines, for outstanding speed, accuracy and economy.

Design . . . Consistent with sound engineering, the fewest number of parts are used . . . all properly proportioned and sturdy, to maintain accurate alignment. Moving parts are bushed with hardened-and-ground bushings, which operate on hardened-and-ground guide pins of liberal size, for long time accuracy. Large draw pistons, connected by a rigid tie member, constitute the draw mechanism.

Adaptability . . . The two widely spaced flat rails on the rollover cradle are designed to take a wide range of pattern sizes. Flask clamps are quickly adjustable lengthwise and vertically. No adjustment in length of draw is needed.

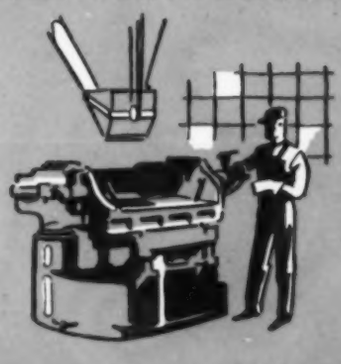
Performance . . . A rapid, true jolt (produced on large anvil in base), rams in minimum time. Clamping can be done automatically while jolting, or can be performed manually if bottom boards or core plates are used. Two small, quick-acting pistons roll the cradle, without shock . . . and also cushion the roll-back. A smooth, slow draw can easily be obtained because of the exceptionally large draw-pistons.

Let us show you how to apply these new machines to YOUR molding and core making requirements. Write today.

★

Call in a
MILWAUKEE
Engineer

Practical DESIGN . . . . *Proven* PERFORMANCE



Foundry Equipment Co.

3238 WEST PIERCE STREET • MILWAUKEE, WISCONSIN, U.S.A.

Ohio Ferro-Alloys Corporation
Canton, Ohio

ANNOUNCEMENT!

SCHUNDLER NOW OFFERS

FIRE CLAY

FESCO FIRE CLAY

FESCO BOND

A pioneer in Foundry Bentonite, F. E. Schundler & Co., Inc., now offers two first quality products . . . a bonding clay known as Fesco Bond and a fire clay known as Fesco Fire Clay. Fesco clays rank with the best because of (1) the location and quality of the deposits, (2) the practical advisory service available, and (3) the Schundler facilities and laboratory control.

The Schundler clay deposits are centrally located in a region recognized as being one of the largest and highest in quality in the nation. The facilities for producing and refining are modern and up-to-date. Just as with Bentonite, Schundler maintains strict laboratory supervision.

Practical Advisory Service

The user of Fesco Clays gets more than a product; he also gets an advisory service which practically assures him of success in his own foundry. This service is supplied by a nationally known consultant available for field work among Schundler users and by a technical and research staff having wide experience in foundry problems.

24-HOUR SERVICE TO MOST FOUNDRY CENTERS

Akron, Ohio	H. S. Stoller
Birmingham, Ala.	Foundry Service Co.
Boston, Mass.	Klein-Farris Co., Inc.
Chattanooga, Tenn.	Frank Robbins, Jr.
Chicago, Ill.	B. J. Steelman
Chicago, Ill.	Wehenn Abrasive Co.
Cincinnati, Ohio	Delhi Foundry Sand Co.
Coldwater, Mich.	The Foundries Materials Co.
Dallas, Texas	Barada & Page, Inc.
Edwardsville, Ill.	Midwest Foundry Supply Co.
Houston, Texas	Barada & Page, Inc.
Kansas City, Mo.	Barada & Page, Inc.
Long Island City, N.Y.	F. E. Schundler & Co., Inc.
Los Angeles, Cal.	Independent Fdy. Supply Co.
Milwaukee, Wis.	Thomas H. Gregg
Minneapolis, Minn.	Smith-Sharpe Co.
Moline, Ill.	Midwest Foundry Supply Co.
New Orleans, La.	Barada & Page, Inc.
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San Francisco, Cal.	Industrial Supply Co.
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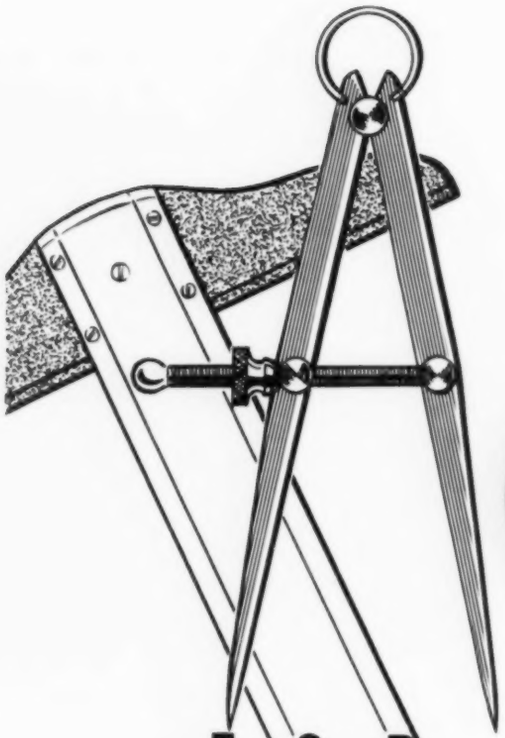
Write for this Booklet

Write today for a complimentary bulletin describing Schundler Fesco Clays and for a Foundry Bentonite Hand-Book.

F. E. SCHUNDLER & CO., INC.
504 RAILROAD AVE. • JOLIET, ILLINOIS

Schundler



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FOR ACCURACY!

SPECIALISTS IN FOUNDRY
CHECKING AND PRESSURE
TESTING FIXTURES FOR
LEADING MANUFACTURERS
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PROCESSING · DESIGNING
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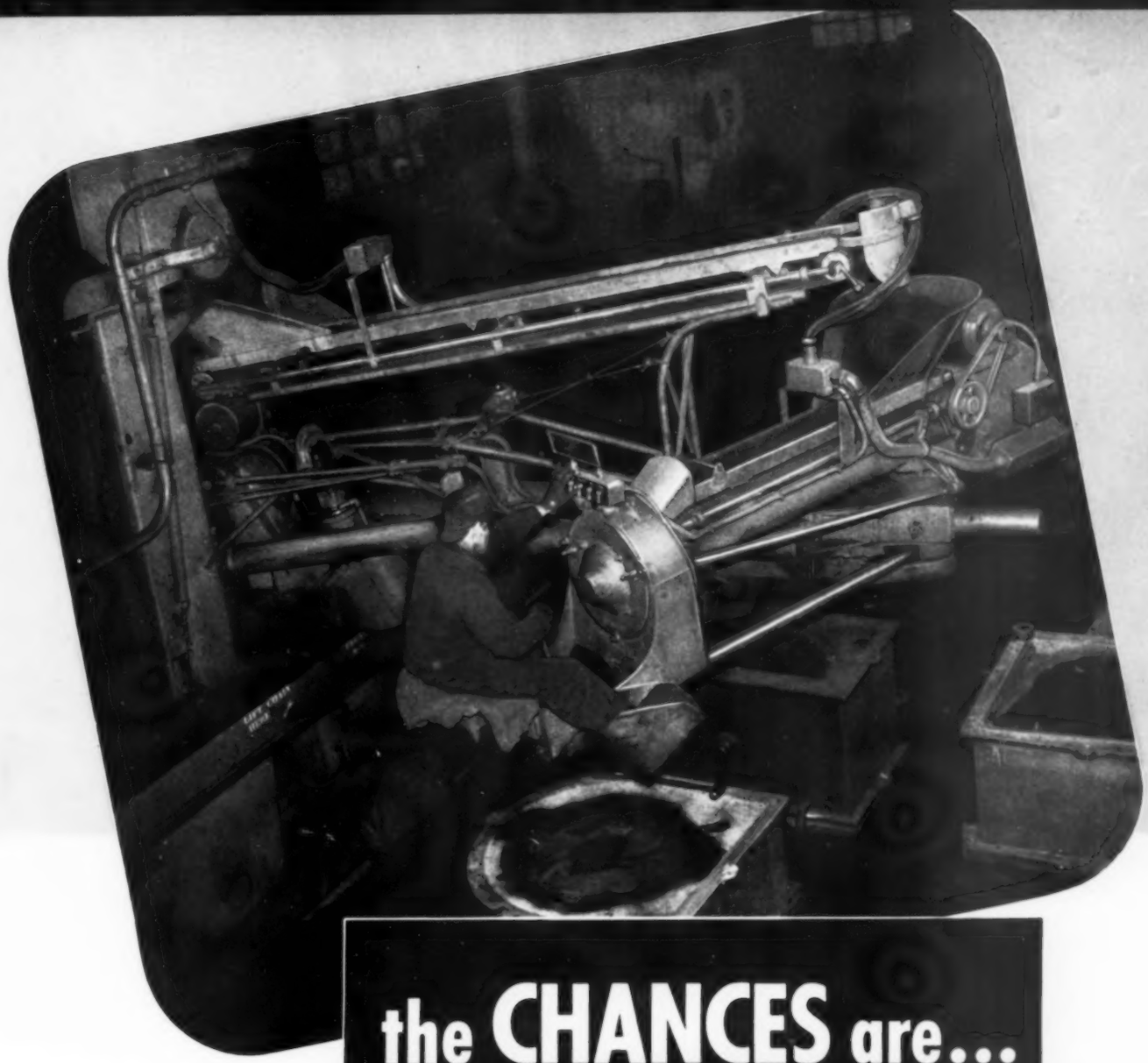

the CHANCES are...

YOU NEED NO ADDITIONAL FLOOR SPACE

Today, the floor space in your foundry is at the highest premium in the history of this age-old industry. But floor space in itself is less than worthless. It is a terrific economic burden unless utilized to the maximum of its productive capacity.

That is why America's outstanding production engineers are demanding more and more *Speedslingers*—the greatest production unit ever devised for ramming molds of all shapes and sizes—from snaps to the largest pit molds.

The *Speedslinger* will double production from your present jobbing floor space. A standard type *Speedslinger* without any special equipment will ram 1,000,000 pounds of sand every eight hours without overloading. And it will give you that enormous production at the lowest cost ever known.

Speedslinger users are saving more than $450 every eight hours of ramming time. And any man, woman or child can learn to operate the *Speedslinger* efficiently in 24 hours.

THE BEARDSLEY and PIPER COMPANY

2541 NORTH KEELER AVENUE, CHICAGO

. . . With Your Ideas on Ways to
SPEED PRODUCTION *with* COMPRESSED AIR

Here's how you can contribute IDEAS to help win the war.

DO THIS: Describe some application of compressed air which speeds production (in your own experience or observation). The IDEA counts—not the grammar. Simple rules mailed on request.

YOUR OPPORTUNITY to pass along ideas which will speed up production and help win the war. Substantial cash prizes offered. Prize-winning papers will be brought to attention of your industry, giving recognition and prestige to the authors. All entries of value to the war effort, whether they are prize-winners or not, will be offered to the proper United States Agency with full credit to the writer.

PRIZES DOUBLED. Because of increased importance of compressed air in the war effort, prize awards as originally announced, have been doubled, and closing date has been extended to July 1, 1942.

ATTENTION EXECUTIVES. Posters announcing this IDEA Award Program are available to enable you to bring this project to the attention of your engineers and shop men. Free on request.

All requests for Rules and Posters should be addressed to Russell Gross, Educational Director, Compressed Air Institute, East Orange, New Jersey.

★ ★ ★ ★ ★ ★ ★ ★

$1000.00 IN CASH AWARDS

FIRST PRIZE $200.00 — THREE PRIZES OF $100.00

TEN PRIZES OF $50.00 — SPECIAL AWARDS $25.00 EACH

For every non-prize winning entry which is accepted for publication in a technical journal, at the request of the Compressed Air Institute.

plus

PERSONAL PRESTIGE and RECOGNITION

Uncle Sam Needs Your Ideas

HERE'S HOW YOU CAN HELP

Describe compressed air applications in your own experience or observation, which speed up production. The IDEA will be passed along to help the war effort. Write today for details

This announcement appears here through the courtesy of

FULLER COMPANY • Catasauqua, Pennsylvania • Member of:

COMPRESSED AIR INSTITUTE..

90 WEST STREET — NEW YORK, N.Y.

BRANDS:

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THE HANNA FURNACE CORPORATION

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Executive Offices: Pittsburgh, Pa.

MEXALOY LININGS ARE DESIGNED FOR EXPANSION AND CONTRACTION . . . .

The elaborately pleated ruffle or lace lining, consisting of the under-garb of this Mexican beauty, serves a purpose other than sheer decorative value. When executing the whirlwind Zapotec dance of their native tribe, the pleats provide for a surplus in changing diameters . . . Not unlike this style factor is Mexaloy's worth as a refractory body when used in linings for ladles, runners, spouts and cupolas. By providing uniform expansion and contraction, Mexaloy increases resistance to spalling and cracking and enables the refractory body to quickly adjust itself to shocking temperature changes.

EWING GALLOWAY PHOTO

THE UNITED STATES GRAPHITE CO.
SAGINAW MICH.

MEXALOY

Time Saved
— on every heat
means MORE WEAPONS FOR VICTORY!

SWINDELL

TOP-CHARGE SWINGING-ROOF

ELECTRIC MELTING FURNACES

● *In action* more hours every day and night, pushing "capacity" to new high levels, Swindell Swinging-Roof Furnaces save many minutes on every charge—*golden minutes which buy more steel!* Top-Charging speed is matched by exclusive Swindell construction advantages —integrated for consistent smooth performance.

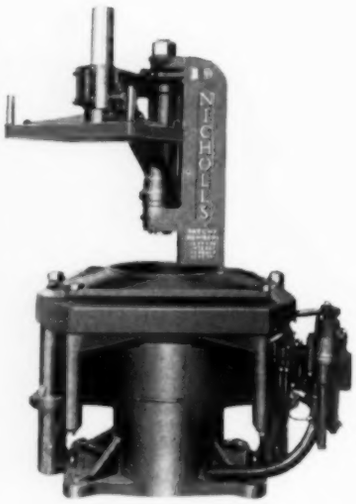
SWINDELL-DRESSLER *Corporation*

DESIGNERS AND BUILDERS OF MODERN INDUSTRIAL FURNACES

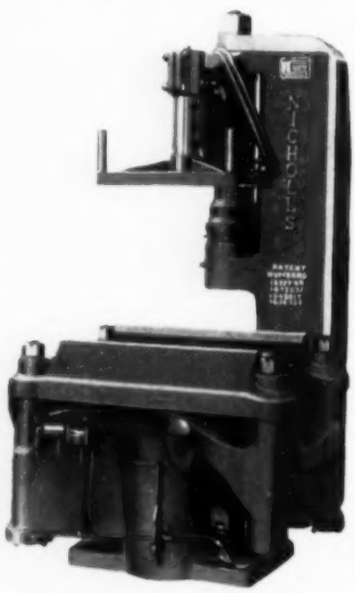
PITTSBURGH, PA.

MOLDING MACHINES

. . . designed for quality---



TYPE 12-D—Heavy Duty—Post Type Combination Jolt Squeeze & Pattern Draw—Equipped with Special Frame



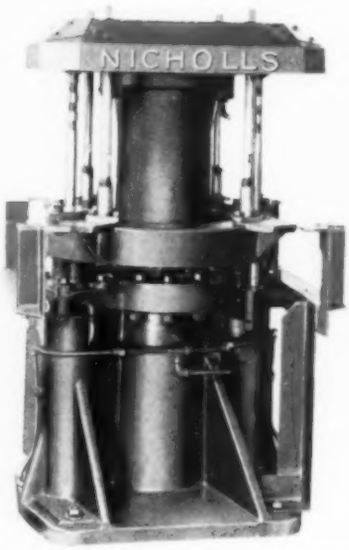
TYPE 16-D-OE—Heavy Duty Combination Jolt, Squeeze & Pattern Draw

FOR YEARS — NICHOLLS Heavy Duty Production Machines have given a tremendous amount of service to their users.

TODAY—More than ever—foundrymen must rely upon their molding equipment to meet war production schedules. They cannot afford to have a breakdown! These machines have played an important role in the success of many large foundries all over the world. This international acceptance is due to their ability to "stand up" under the heaviest production.

Our Type D Molding Machines are built in nine sizes.

We invite you to write for particulars on the NICHOLLS 1942 model production line of Molding Machines.



TYPE 8-JS—Jolt Stripper—Adjustable Pin Lift

TYPE 16-36-DC—Heavy Duty—Jolt Squeeze & Pattern Draw—Equipped with Special Top Frame

WM. H. NICHOLLS CO., Inc.

RICHMOND HILL · LONG ISLAND · NEW YORK

Foreign Manufacturers and Selling Agents—
For Continental Europe and Great Britain—The George Fischer Steel and Iron Works, Schaffhausen, Switzerland

FOUNDRYMEN OF AMERICA ATTENTION!

REPLACE TIN CONTENT BRONZES WITH

HERCULOY*

COPPER SILICON ALLOY

INGOTS FOR SAND CASTINGS

HERCULOY SUPERIORITY:

HERCULOY is not an emergency product! In use for many years, it enjoys widespread acceptance for general foundry castings, such as valves, valve bodies, flanges, fittings, pumps, electrical equipment, marine hardware, etc.

HERCULOY is a complete alloy ingot! Merely melt and cast. Deoxidizers or hardening agents unnecessary. The metal possesses excellent fluidity. Castings are sharp in detail. Minimum of surface finishing required. Welds satisfactorily. Non-magnetic.

HERCULOY makes good pressure castings! Foundry tests indicate that this alloy has withstood hydraulic pressures well over 1000 p.s.i.

PROPERTIES: nominal composition of Herculoy is Copper, 92; Tin, .25; Silicon, 3.5; Zinc, 4.5. Conforms to Gov. Spec. 46B28 and QQ-C-593. Physical properties are equal or superior to most tin bronzes. Tensile strength is approximately 50,000 p.s.i., and Elongation 40%. Melting Point—1875°F.; Specific Gravity—8.54; Weight—.308 lb. per cu. in; Pattern Makers Shrinkage—3/16″ per ft.

For additional information and complete technical data, contact our nearest sales office.

*A Patented Product

Federated Metals Division

AMERICAN SMELTING AND REFINING COMPANY

120 BROADWAY **NEW YORK • N. Y.**

BALTIMORE, MD.
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(Chicago District)

A Completely Automatic

DUST COLLECTOR

from Intake to Sludge Removal

No Pumps!
No Spray Nozzles!
No Cloth Screens!

In buffing or grinding operations, burring, shot blast, wheel dressing, molding and other foundry work—in fact, for practically every industrial production operation where dust impedes production or endangers the health of employes—the Mahon Hydro-Foam Dust Collector offers to industry an exceptionally simple and economical means of dust collection and removal. *It is entirely automatic in operation*—both as to the method of dust collection and, if desired, in the removal of the dust from the Unit after collection, in the form of sludge. *Operates on an entirely pneumatic principle—depositing the dust under water.* Having no moving parts in the Unit proper and no pumps, spray nozzles or cloth screens, there is nothing to clog, get out of order or be subjected to excessive wear. The only moving parts are the sludge removal equipment and the suction-exhaust fan, located outside the Unit. If dust removal is a problem in your plant, investigate the Mahon System of elimination. Without obligation, trained Mahon engineers will make a survey of your particular needs. They will show you how effectively this advanced method is serving under conditions equivalent to your own—and doing a thorough, competent job—*with greater economy.* Don't delay—*write today.*

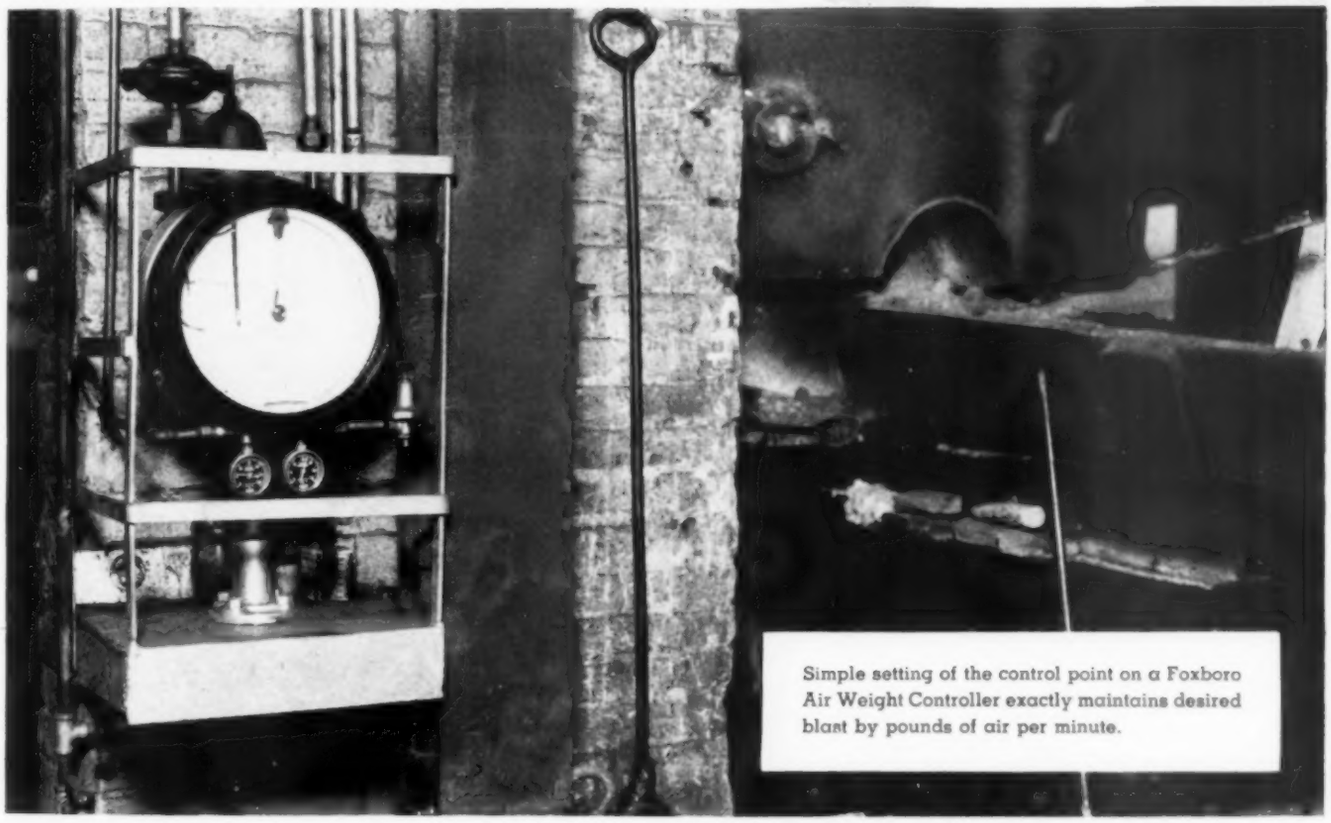
THE R. C. MAHON COMPANY
DETROIT • CHICAGO

Designers and Manufacturers of Metal Cleaning Machines, Rust Proofing Machines, Hydro-Filter Spray Booths, Ovens of All Types, Filtered Air Supply Systems, Hydro-Foam Dust Collectors—and Many Other Units of Special Production Equipment—Including Complete Finishing Systems.

MAHON *Hydro-foam* DUST COLLECTOR

This "Phantom Foundryman"

BOOSTS YOUR DAILY TONNAGE!



Simple setting of the control point on a Foxboro Air Weight Controller exactly maintains desired blast by pounds of air per minute.

Easily-installed Foxboro Controller keeps heats hotter . . . ends pigging and rejects

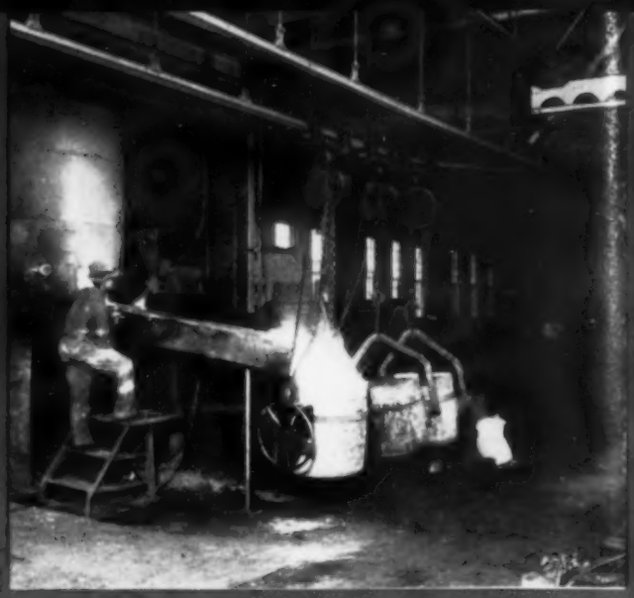
Instead of pigging the first run of every heat, why not convert it into good, sound castings, and boost your output tonnage? By installing a Foxboro Air Weight Controller on your blast line, you can insure this added production *every day!*

This "phantom foundryman" requires only simple installation. Yet it automatically controls the blast by *weight* of air, instead of volume . . . maintains uniformly hotter heats from start to finish, regardless of wind-box pressure, atmospheric temperature or barometric pressure. You'll get consistently better melting . . . hotter heats without burning ing . . . uniform pouring conditions that prevent faulty castings and eliminate pigging!

Write for Bulletin B-268 on Foxboro Air Weight Controllers; or detailed information on other Foxboro Instruments. The "Phantom Foundryman" is only one example of Foxboro's Creative Instrumentation that can boost output, cut costs and save maintenance in wartime production. **The Foxboro Company, 32 Neponset Avenue, Foxboro, Mass., U. S. A.** Branch offices in principal cities.

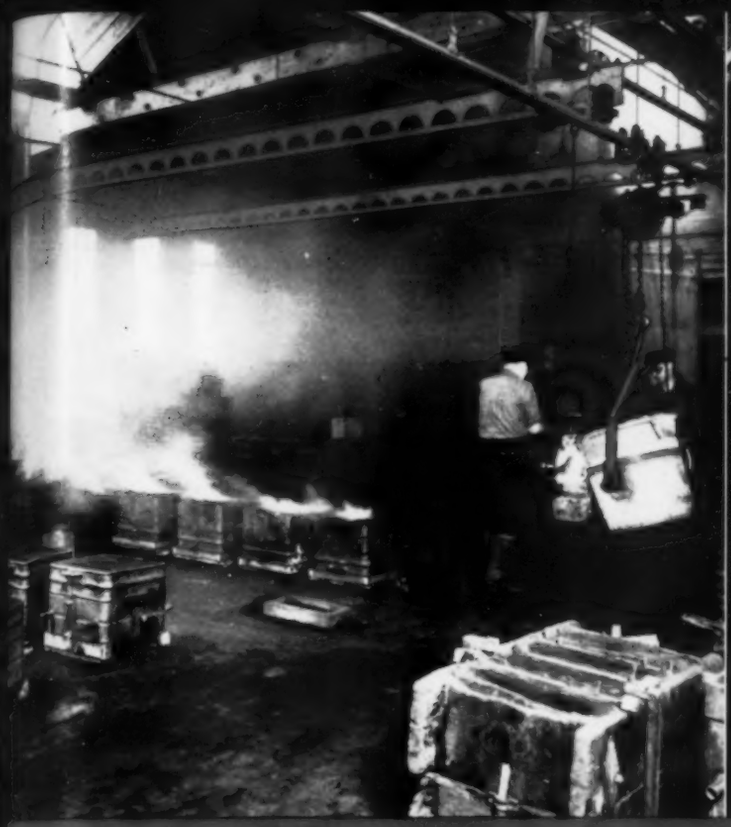
RECORDING · CONTROLLING · INDICATING

FOXBORO
REG. U. S. PAT. OFF.
Instrumentation

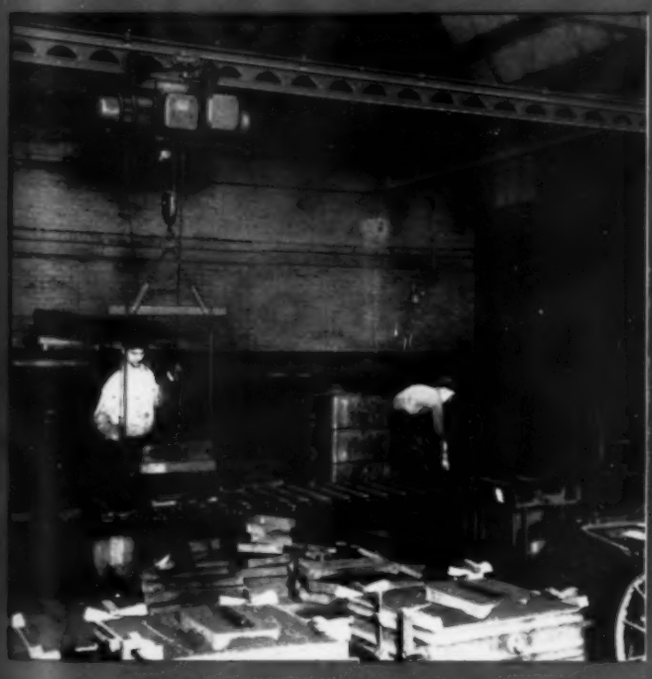


...PRODUCTION

A VITAL WORD SYNONYMOUS WITH CLEVELAND TRAMRAIL



CLEVELAND TRAMRAIL SPEEDS FOUNDRY PRODUCTION



Today one of the most vital words in the dictionary is PRODUCTION. Every device conceivable is being considered or adopted that will aid the output of a plant. This holds true in foundries. Castings of every kind are needed badly in the war program.

When one considers that from 25 to 100 tons of materials (such as sand, flasks, molds, cores, pig iron, scrap, molten iron, rough castings) are handled to produce one ton of finished castings, the importance of the labor and time required for handling is more fully appreciated. Indeed, one of the most important ways of stepping up production in a foundry is through use of equipment that will facilitate handling.

In hundreds of foundries Cleveland Tramrail has eliminated a vast amount of unnecessary rehandling and greatly reduced manual drudgery. Because of this modern overhead materials handling equipment many more tons of castings are being produced with the same facilities and labor.

BOOKLET No. 2008 . . Packed with valuable information. Profusely illustrated. Write for free copy on your company letterhead.

GET THIS BOOK!

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
1153 EAST 283rd ST. WICKLIFFE, OHIO.

MANUFACTURERS OF • CLEVELAND CRANES • CLEVELAND TRAMRAIL • STEELWELD BENDING PRESSES

CLEVELAND TRAMRAIL

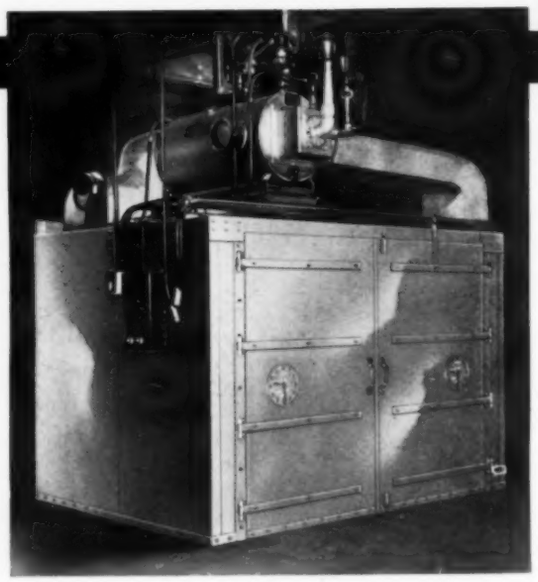
OVERHEAD MATERIALS HANDLING EQUIPMENT

PHONE DESPATCH . . . THEY'LL BUILD THAT NEW CORE BAKING OVEN FAST!

He buys DESPATCH CORE OVENS with

Confidence

. . . after careful production analysis in his own foundry



★ **MORE OUTPUT**
★ **BETTER CORES**
★ **LESS COST**

TYPICAL of many foundrymen, this executive has the facts on Despatch oven performance; he has kept an operating check-up for years in his plant. He has tabulated the increased core output obtained in both batch-type and conveyor-type Despatch Ovens. He has noted the absence of rejects due to improper baking. He has seen how his operators apply the Despatch principle of heat control to bake evenly both large and small cores—in the same oven and at one time. And he has watched his cost per ton of core-baking drop below 17c.

Naturally he looks to Despatch now. He understands thoroughly the great advantage of the Despatch heating system in his core or mold oven.

He also knows that Despatch can build and install ovens *fast*. And the patented Despatch prefabricated non-thru metal panel construction not only simplifies building—it also guarantees the saving of 23% of the normal heat loss, from the more efficient insulation.

The Despatch Heating Principle and other Despatch features which improve oven performance are fully described in Bulletin No. 31.

WRITE TODAY FOR YOUR COPY.

DESPATCH
OVEN COMPANY MINNEAPOLIS, MINNESOTA

WASHED DRIED AND SCREENED SILICA SAND

Carefully Selected and Graded for Foundry Use—

FOUNDRY men throughout the country know the exceptional qualities of the uniformly screened grades of silica sand produced by the Ottawa Silica Company.

The grains being almost spherical, afford greater permeability and consequently finer sand can be used, effecting better finish.

Ottawa sands are durable! They do not break up! They are ideal for sand slinger work and are without equal for all foundry purposes where synthetic sands are employed.

FLINT MOLDING AND CORE SAND SILICA

A HARD, fast-cutting, thoroughly washed, dried Sandblast Sand, screened to uniform size, is produced by the Ottawa Silica Company and sold under the trade names FLINT SHOT and DIAMOND SANDBLAST SAND. It is the most economical agent that can be employed for all kinds of exacting sandblast cleaning. The round, pearl-like grains are hard as flint. They do not split up, but wear down uniformly and can be used over again many times. This abrasive flows freely, requiring less air power and gives the castings a smooth, silvery-like, velvety finish. Ask for our booklet, "Sandblasting Up To Date".

FLINT IT PAYS TO USE SHOT

DIAMOND SAND BLAST

THE Ottawa Silica Company's three mills operate continuously the year round, making it possible to supply foundries with material promptly. Production includes a complete line of foundry sands suitable for molds, cores, furnace bottoms, sandblasting, for use generally in the steel, grey iron and non-ferrous fields—also Ground Silica (Silica Flour). The Ottawa Silica Company's engineering staff is always available for consultation and service on problems relative to the use of Ottawa Sands.

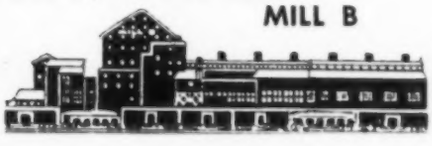
CRYSTAL 99% PURE SILICA

OTTAWA SILICA COMPANY

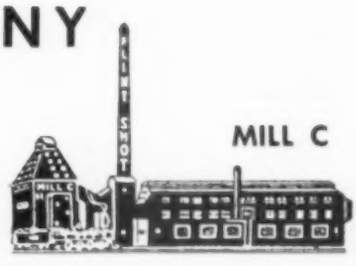
Ottawa, Illinois

MILL A

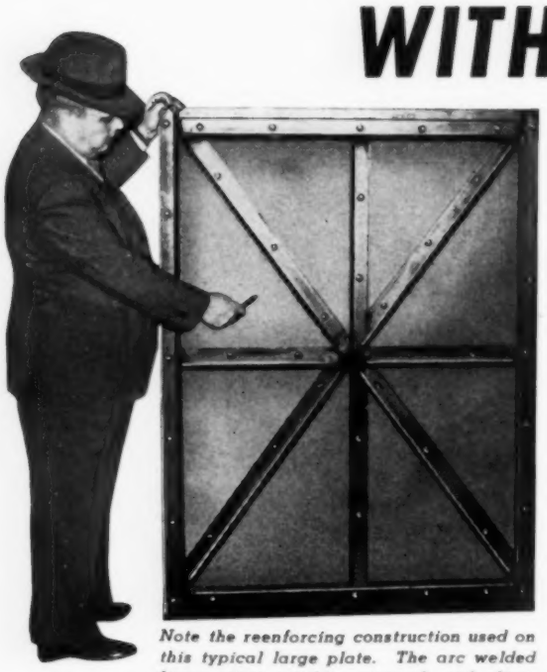
MILL B



MILL C



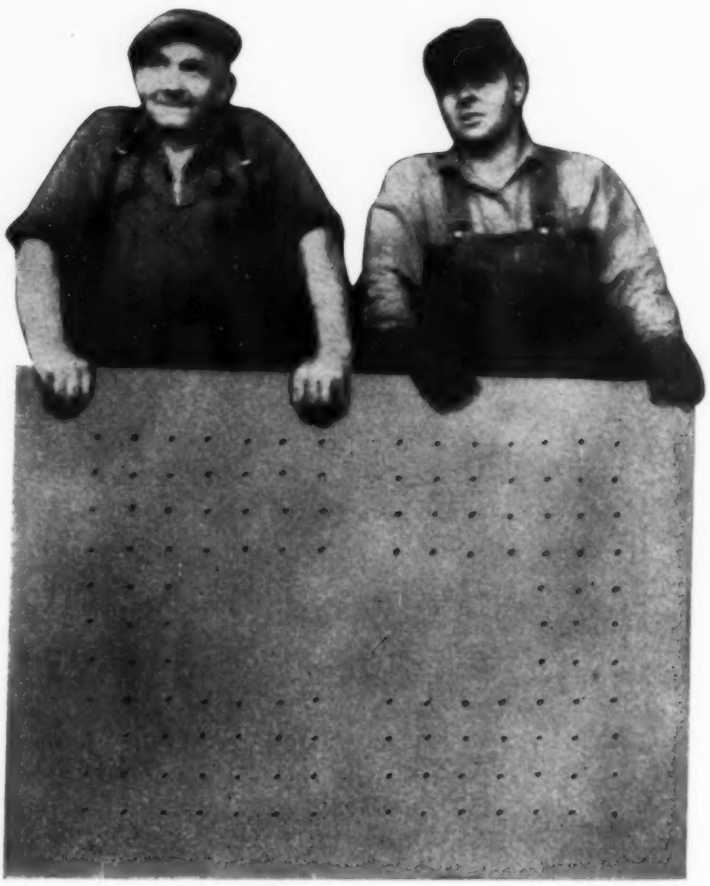
CARRY CORES UP TO 1200 LBS. WITHOUT DEFLECTION!



Note the reenforcing construction used on this typical large plate. The arc welded frame gives rigidity, strength and eliminates deflection.

IT IS BEING DONE ON DIAMOND REENFORCED STEEL CORE PLATES

These special core plates are designed to carry large cores up to 1200 lbs., cores of any size, without deflection or warping.



You may obtain Diamond Core Plates to suit your own special requirements. They are furnished with or without perforations and in all smaller, standard sizes—plain or reenforced as indicated by your needs.

Send us detailed information on your core baking problem and we'll be glad to design a plate to handle the job. Weight of core and dimensions, in particular.

DIAMOND

CLAMP AND FLASK COMPANY

Telephone 2553 **Richmond, Indiana**

Designers of* CORE PLATES, JACKETS, BANDS, FLASKS *since 1889

4 Reasons

WHY *You* SHOULD BUY

BLACK HILLS BENTONITE

1 **QUALITY.** We are the ONLY producer located in Belle Fourche, S. D., shipping ALL Wyoming pure colloidal Bentonite.

2 **PRICE.** How does the price you are paying *now* for bentonite compare with what you paid *a year ago* before we entered the field?

3 **FACILITIES.** We have the newest and most modern bentonite plant. We have, already *purchased and in reserve*, an extra dryer and an extra mill.

4 **SERVICE.** ECP pays SEVEN full-time service engineers to help you get better molds, better castings, less scrap and most bonding strength per dollar.

EASTERN CLAY PRODUCTS, INC. • EIFORT, OHIO

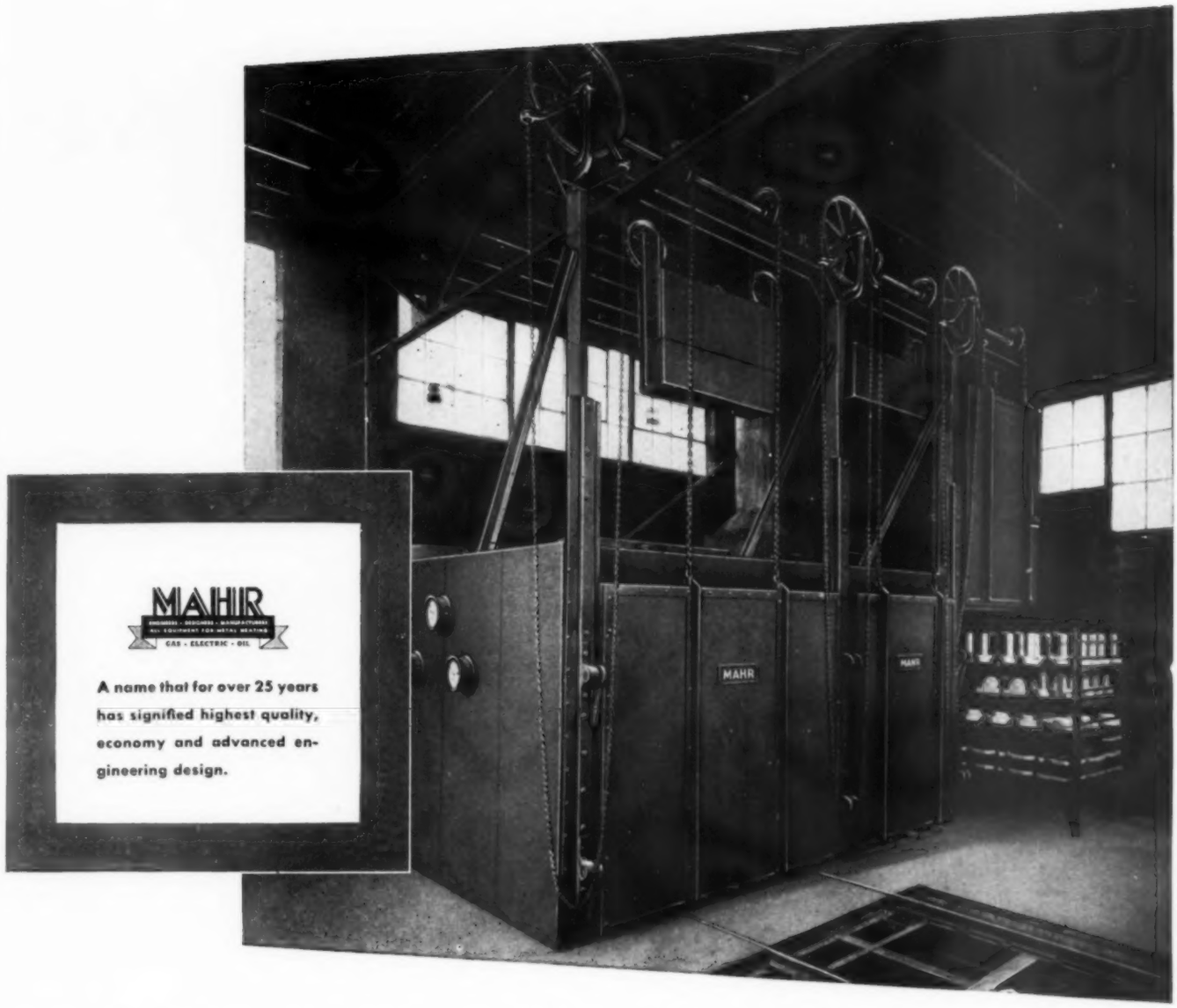
ECP

DIXIE BOND • BLACK HILLS BENTONITE • REVIVO BOND • REVIVO SUPER BOND • BALANCED REVIVO

All TYPES OF BONDING CLAYS

A Foundry Sand Service Based Upon Practical Research

Major
PRODUCTION
Operations
DEMAND THE BEST
And "the best" in Chaplets, Chills and Superchills (patented) has long been identified with the fine old name of Fanner.
Today, more than ever, when there can be no compromise with either time or quality in turning out the best possible castings in the shortest possible time, the need for these vital Fanner products is a very essential "must" in every successful production speed-up.
Our engineering experience is "at your service" in helping you take full advantage of speeding up your casting program with Fanner Chills, Chaplets and patented Superchills. Call on us.
TO SPEED
WAR PRODUCTION
Use
FANNER
CHAPLETS AND
CHILLS
THE FANNER MANUFACTURING CO.
Brookside Park, Cleveland, Ohio
Canadian Fanner, Ltd. Hamilton, Ontario



ASK FOR YOUR COPY OF THIS new BOOK

At the very foundations of our victory program stand the foundries of America. From them must flow, rapidly and continuously, the millions of castings needed for the tools of this war . . . Just off the press, this new MAHR Bulletin No. 750 tells the intimate and complete story of the ovens, furnaces, ladle dryers, torches etc. that play such an important part in the production of any good foundry. *Ask today!*

MAHR is making exceptionally prompt deliveries under unusual conditions. Ask about them.

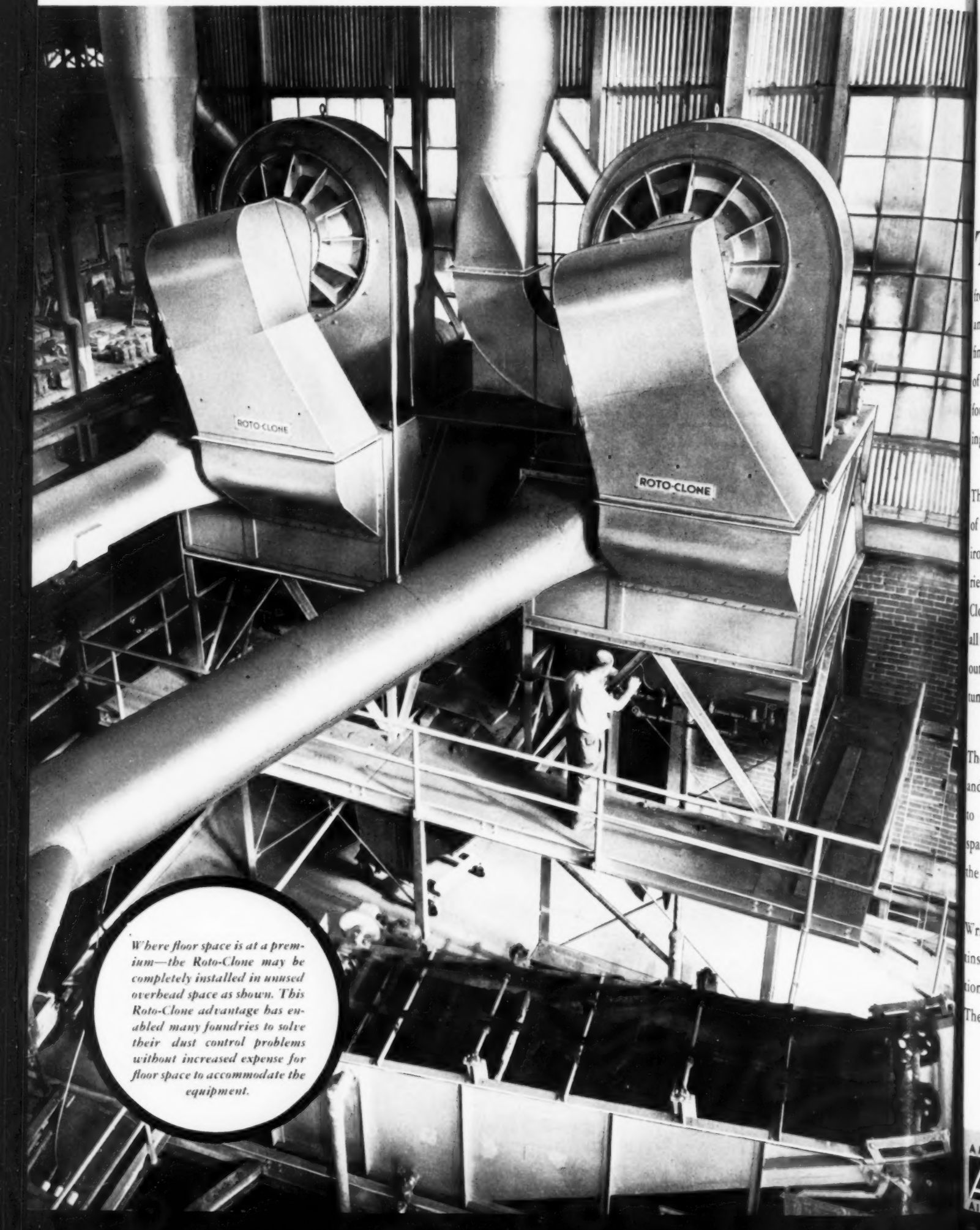
DIAMAHR

MAHR MANUFACTURING CO.

DIVISION OF DIAMOND IRON WORKS, INC.

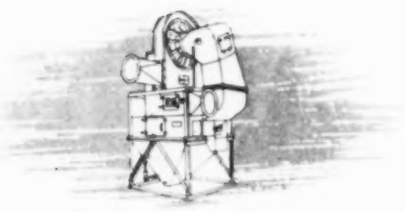
MINNEAPOLIS, MINNESOTA, U. S. A.

ROTO-CLONE DUST



Where floor space is at a premium—the Roto-Clone may be completely installed in unused overhead space as shown. This Roto-Clone advantage has enabled many foundries to solve their dust control problems without increased expense for floor space to accommodate the equipment.

CONTROL IN STEEL FOUNDRIES

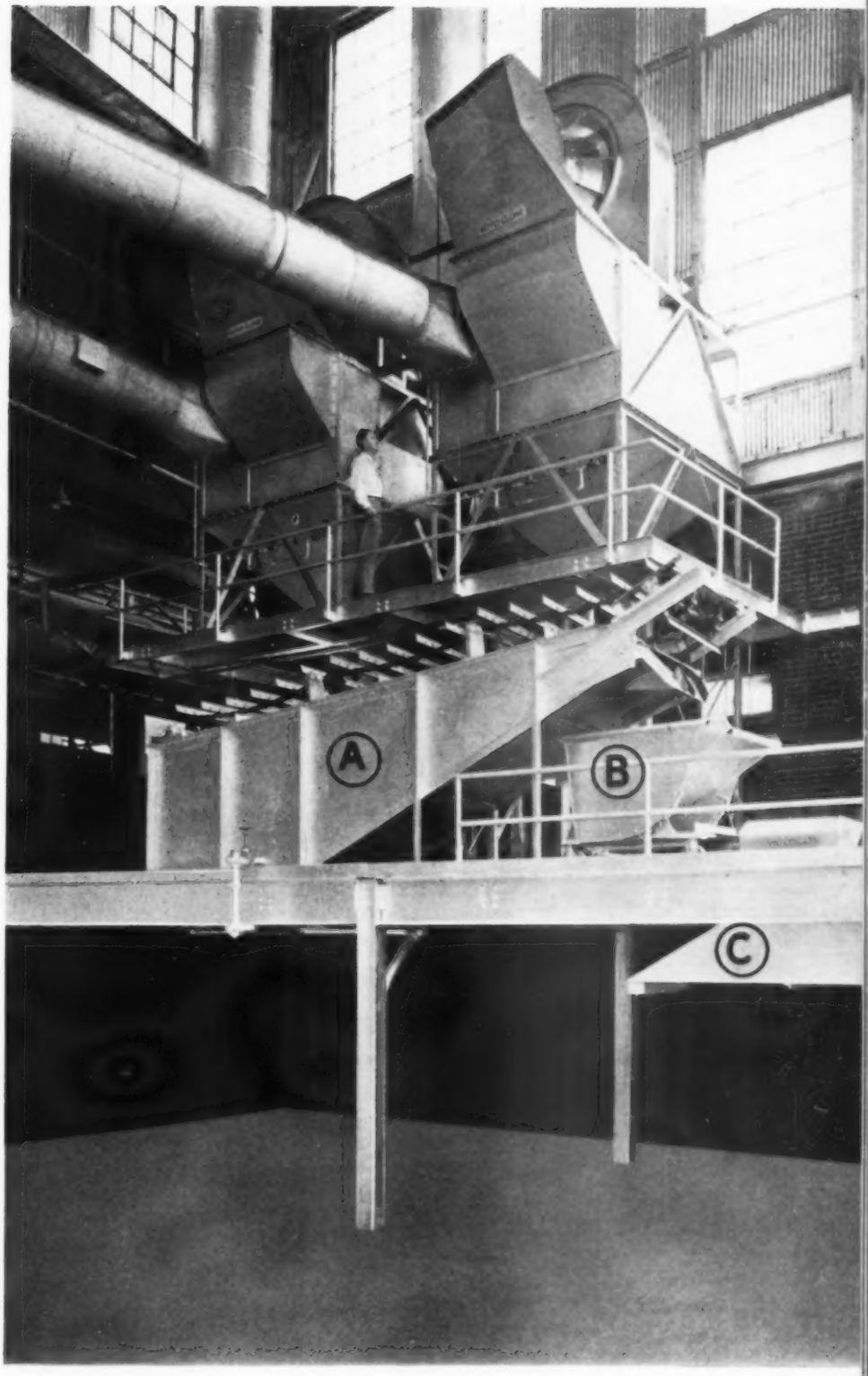


THESE two No. 27 Type W Roto-Clones effectively control the dust from sand conditioning equipment, and exhaust the required amount of fines, to insure uniform permeability of the molding sand, in a large steel foundry recognized for the outstanding quality of its castings.

This installation is typical of hundreds of Roto-Clone systems in steel, gray iron, malleable and non-ferrous foundries throughout the nation. Roto-Clone offers complete dust control for all foundry operations including shake-out, sand handling, screens, mullers, tumbling mills, blasts, grinders, etc.

The advantages of compact design, and the adaptability of the Roto-Clone to overhead installation when floor space is limited, are well illustrated in the pictures shown here.

Write for complete descriptive bulletins on the Roto-Clone and its application to all foundry dust problems. There is no obligation.



Roto-Clones can be readily arranged for central sludge disposal when desired. In this installation, the sludge water drains by gravity into a central settling tank (a) which is equipped with automatic ejector for continuous removal of the settled sludge. Ejector drops sludge into a receiving bucket (b) from which it can be dumped onto tilting chute (c) for discharge into truck on ground floor.

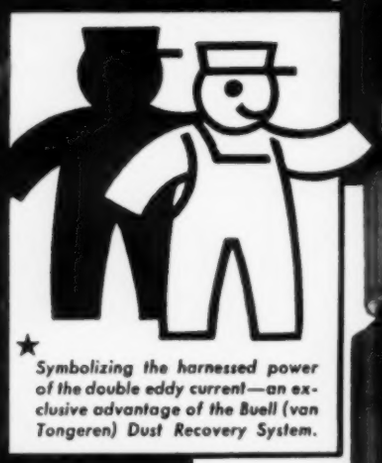
AMERICAN AIR FILTERS

AMERICAN AIR FILTER COMPANY, INC., 266 CENTRAL AVE, LOUISVILLE, KY.
INCORPORATED

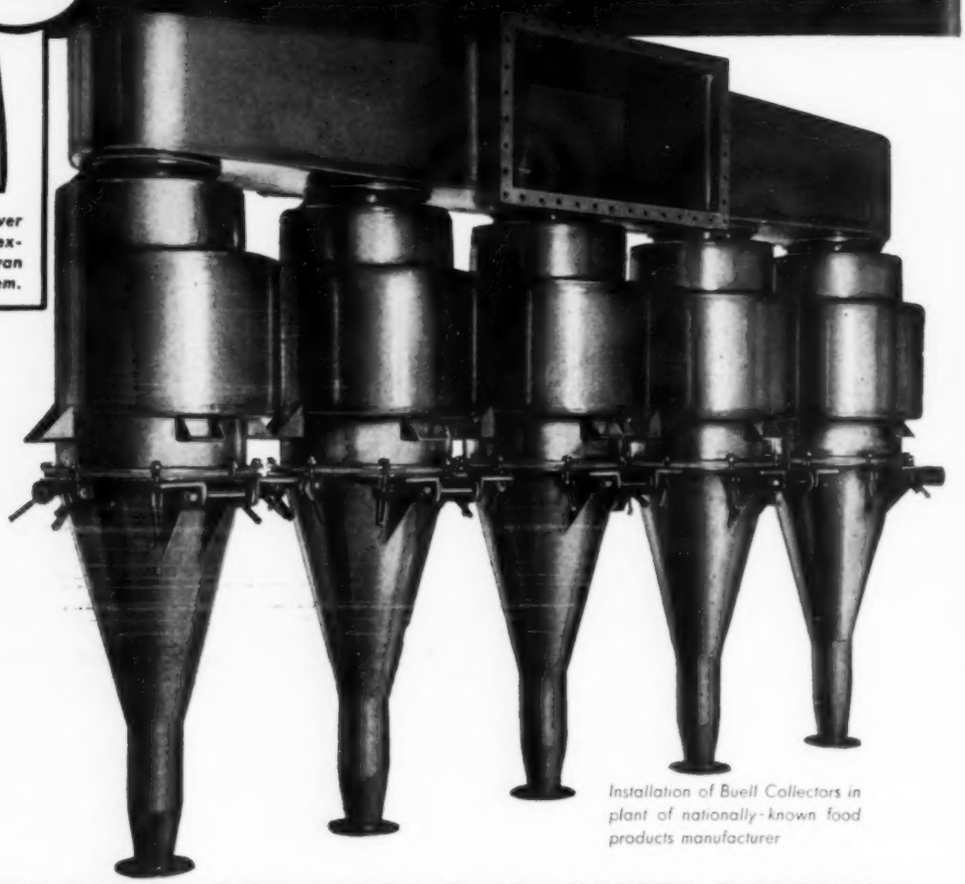
IN CANADA, DARLING BROTHERS, LIMITED, MONTREAL, P. Q.

"Double Eddy"★ says:

The buyer wanted to know how much dust this collector would recover



★ *Symbolizing the harnessed power of the double eddy current—an exclusive advantage of the Buell (van Tongeren) Dust Recovery System.*



Installation of Buell Collectors in plant of nationally-known food products manufacturer

BUELL GAVE THE MOST ACCURATE GUARANTEE KNOWN

Buell's "fractional efficiency" guarantees are famous for their accuracy. Briefly, they are guarantees to collect a definite percentage of the dust particles of each size—a guarantee that holds regardless of the inevitable and continual changes in particle size distribution that make it impossible ever to give an unqualified overall efficiency guarantee. Buell's guarantees are conservative and actual performance usually betters the guarantee.

For a typical installation, here are guarantees and actual performance:

Particle* Size in Microns	Guaranteed to Collect	Actual Collection
0 to 10	61%	63.2%
10 to 20	92%	92.6%
20 to 30	98%	98.5%
30 to 43	99%	99.4%
plus 43	99.5%	99.8%

*Specific Gravity—2.0

May we send you a copy of our special bulletin *"Fractional vs. Overall Efficiency Guarantees"*? Simply request it on your letterhead.

BUELL'S 6 PLUSES

Buell (van Tongeren) Dust Recovery Systems offer every user these six plus advantages...

- + *High Recovery Efficiency*
- + *Low First Cost*
- + *Low Maintenance*
- + *Unlimited Capacity*
- + *Long Life*
- + *Fractional Efficiency Performance Guarantees*

...all good reasons why so many of America's leading industrial concerns prefer Buell.

BUELL ENGINEERING CO., Inc., *14 Cedar Street, New York*

Nation-wide service through offices of either Buell Engineering Co. or B. F. Sturtevant Co.

buell
DUST RECOVERY SYSTEMS

CONSULT BUELL *First* IN DUST RECOVERY

for Chemical • Rock Product • Metallic • Food • Flue or any other dusts

FOR MELTING NON-FERROUS ALLOYS

BIG PRODUCTION FOR A SMALL INVESTMENT

INSTALL CRUCIBLE FURNACES

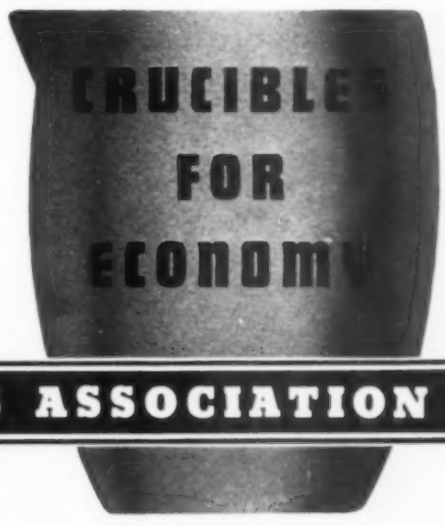
Shown in the illustration are 8 No. 70 Crucible Furnaces using oil fuel. (Gas can be used just as well.) The crucibles are lifted out with tongs and without transferring the metal to any other container the flasks are poured off *direct*. The metal can't chill. Meanwhile another crucible is set in the empty furnace and in thirty to forty five minutes another crucible full of clean, non-gassed metal is ready to pour. THAT'S SPEED.

And think of the FLEXIBILITY: The alloy may be changed whenever desired. There is no absorbed metal in the crucible to contaminate the next melt.

MELTING COST with crucible furnaces, either stationary or tilting types is well recognized to be the lowest by far: the investment charge is the smallest item in the total cost when you install CRUCIBLE FURNACES.

* * *

Don't decide on non-ferrous melting equipment without consulting a CRUCIBLE FURNACE MANUFACTURER *or write to the address below for information.*



CRUCIBLE MANUFACTURERS ASSOCIATION

90 WEST STREET, NEW YORK, N. Y.

Increase Production with
ROTOPLANE Speed Sifters

"Hard-to-Please" Foundries Standardize on Rotoplane!

ORDER FROM YOUR FOUNDRY SUPPLY HOUSE

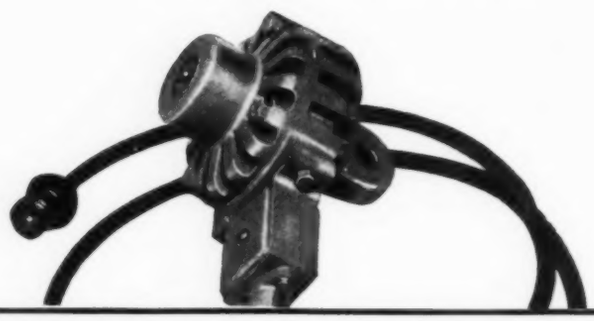
Try ROTOPLANE in your plant. You, too, will find it increases production, does *all* your sifting more quickly and economically. One size and type for all sifting jobs.

ROTOPLANE is built for long, dependable service. Strong, one-piece frame gives remarkably effective vibration. Smooth, free, rotary action. All mechanism completely enclosed and dustproof. Weight approx. 90 lbs., 62 in. high overall.

Steel-mounted sieves instantly interchangeable. No jagged screen edges, no storage problem. 20 in. diameter clear sifting area.

TEN DAYS FREE TRIAL.

$175.00 f.o.b. Chicago—complete with cable, safety ground wire, one sieve (2-4 mesh). Standard ⅓ h.p. motor, 115-230 volts 60 cycle single phase.
Prices with other motors quoted on request.



ELECTRIC VIBRATORS

True-to-pattern castings make satisfied customers . . . more repeat business. Increase your production and castings quality with RED Electric Vibrators. Sturdy, dustproof, lowest operating cost (electricity does not freeze). Unequaled for consistent year-'round results in foundries all over the world.

(All Prices f.o.b. Chicago)

No. 1—Light match plate work	$10.00	No. 5—Heavy match plate, tub, bench	$17.00
No. 2—Medium match plate	13.00	No. 9—Machine and heavier	24.00

•

FOUNDRY SUPPLIES MANUFACTURING CO.

2221 Orchard Street — Chicago, Illinois

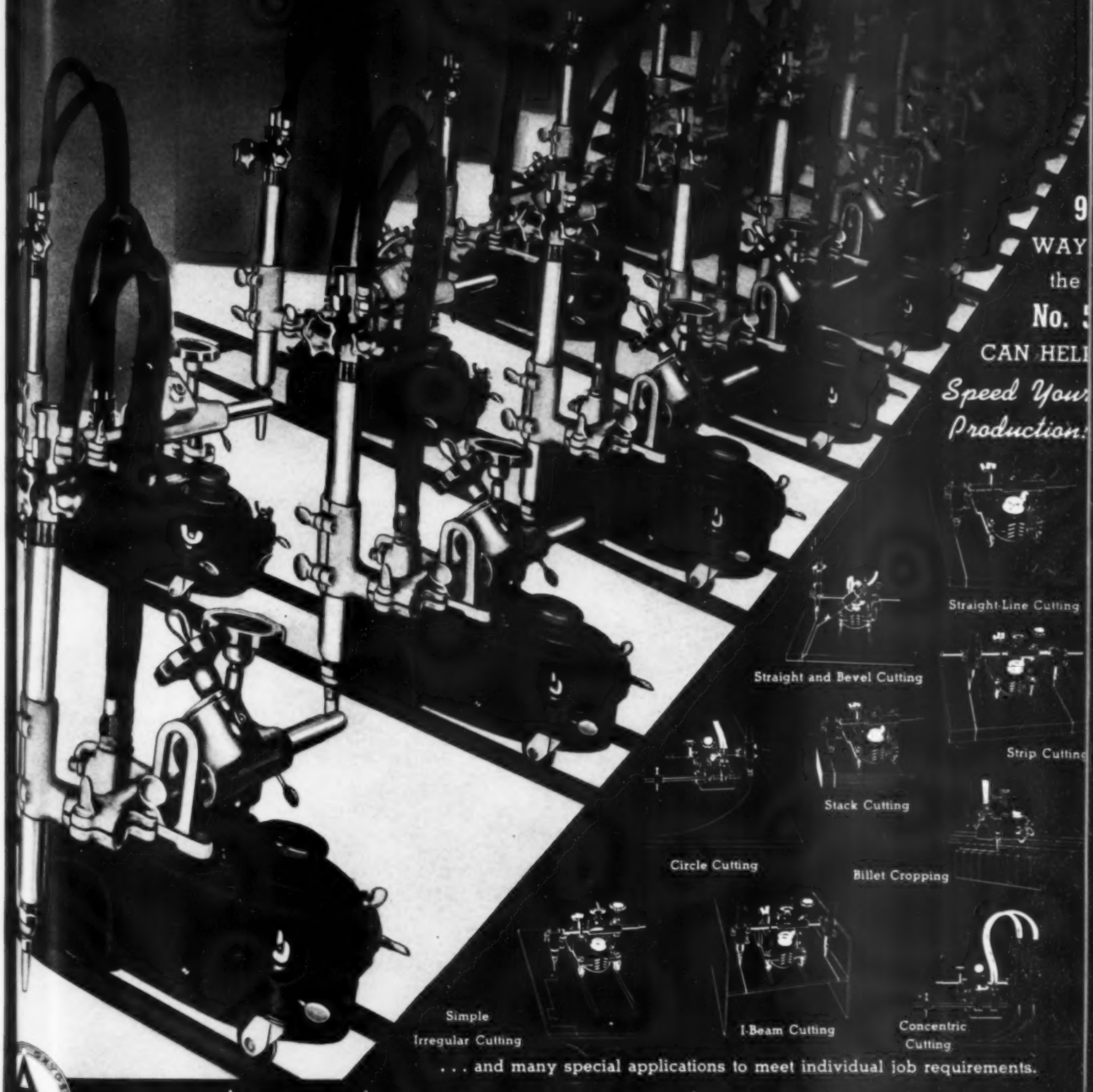
CABLE ADDRESS: "ROTOPLANE CHICAGO"

. . . RAILROAD SHOPS . . . SHIP YARDS . . . JOB-WELDING SHOPS . . . AND GENERAL FABRICATORS ARE USING

NATIONAL No. 5

OXY-ACETYLENE CUTTING MACHINES TO *Speed Production!*

A No. 5 may solve one (or more) of your production problems . . . request all the facts!



9
WAY
the
No. 5
CAN HELP
Speed Your Production!

Straight-Line Cutting

Straight and Bevel Cutting

Strip Cutting

Stack Cutting

Circle Cutting

Billet Cropping

Simple Irregular Cutting

I-Beam Cutting

Concentric Cutting

. . . and many special applications to meet individual job requirements.

NATIONAL CYLINDER GAS COMPANY

205 W. Wacker Drive — Chicago, Illinois

Offices in Principal Cities

BE A

WASTE WARDEN

lend a hand to "Keep 'Em Rolling"

FOR VICTORY

UNCONSCIOUS waste in this land of plenty can become a serious handicap in our war effort. Let's take a case in point — oxygen. This element is vital to the speedy production of tanks, trucks, guns, ships, planes, and shells.

Oxygen consumption continues to skyrocket and the bottleneck remains steel cylinders. They just can't be obtained fast enough. But, we can all help by making every cylinder most useful. Here's how:

Make yourself a Waste Warden. See that the cylinders keep rolling. Don't let them get tied up in inventory. Be sure that cylinders are shipped back promptly when they are empty — and be sure to get the most gas out of each cylinder. If you see to it that these and other "do" and "don't" suggestions are followed you will be making a worthwhile contribution to our war effort as well as helping yourself.

Join the "Waste Wardens". Keep the cylinders rolling.

WASTE WARDEN SAYS:

DO close cylinder valve after use.
DO check your hose and connections for leaks.
DO keep inventory low.
DO return empty cylinders promptly.
DO keep tips clean and free from carbon and slag.

DON'T use excessive pressure.
DON'T use oversize tip.
DON'T leave tip burning when not in use.
DON'T abuse cylinders.
DON'T leave cylinder valves open when gas is not being used.

Air Reduction

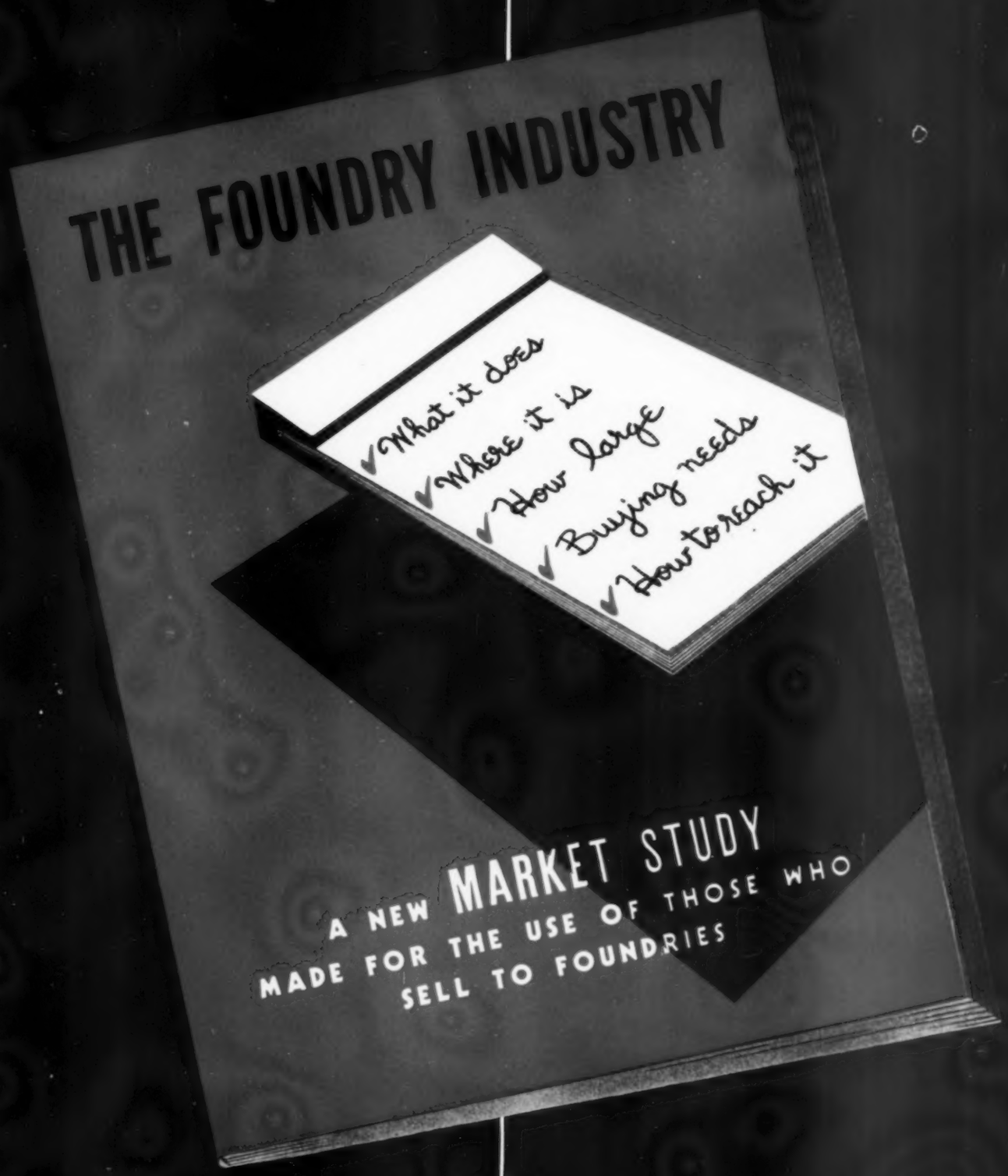
60 EAST 42nd ST., NEW YORK, N. Y.

IN TEXAS: MAGNOLIA-AIRCO GAS PRODUCTS CO.

AIRCO

WILSON

IDLE CYLINDERS ARE PRODUCTION SLACKERS: *Keep 'em rolling for victory!*



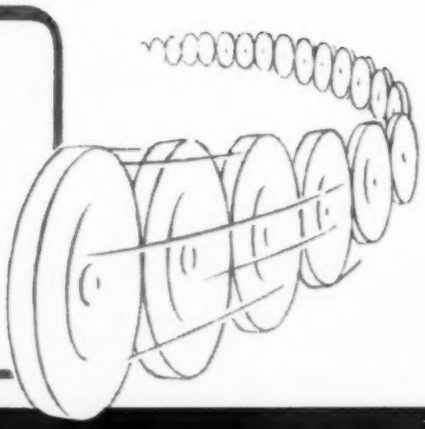
Here's new, authoritative, vital information about the foundry industry . . . Collected and compiled in usable form . . . Data on this *basic* industry will assist in answering practically every marketing question . . . Write today for your copy of this *new* market study . . . just off the press.

herever Metals Are Cast . . . You'll Find . . .

THE FOUNDRY

PENTON BUILDING • CLEVELAND, OHIO

...WE NEEDED GRINDING WHEELS Pronto!



"SAFETY" GRINDING WHEELS ASSURE FASTER WORK AND IMMEDIATE DELIVERY!

NEW GRINDING PROBLEMS

"Our entire production was faced with the problem of changing, almost over night, from peacetime consumer commodities, to the manufacture of parts for battleships, tanks and guns. Entirely new grinding problems confronted us. We . . .

NEEDED COMPETENT ADVICE

"Our nearby 'Safety' Grinding Wheel Sales Engineer helped us solve our problems by showing us how to convert present equipment to new demands, and by specifying the proper 'Safety' Wheel for each new task. When production . . .

SCHEDULES THREATENED

'Safety's' nearby warehouse stocks supplied stock wheel needs, while 'Safety's' modern plant and research staff gave us immediate attention on more specialized needs. Production schedules were saved by 'Safety's' ability to deliver 'pronto' faster cutting grinding wheels."

SAFETY GRINDING WHEELS are your answer to obtaining the "right wheels when and where you want them."

"Safety" now has nine major distributing centers where "Safety" stock wheels are stored on warehouse shelves . . . and twelve sales offices in key defense centers where you can contact a "Safety" Sales engineer to help you with your immediate grinding problems.

Our plant has been recently modernized and re-equipped, enabling "Safety" to fill your requirements promptly.

9 SUPPLY OUTPOSTS . . . 12 FIELD OFFICES

To obtain the phone number of the sales office or warehouse nearest you, consult the list shown below.

"Remember Pearl Harbor"

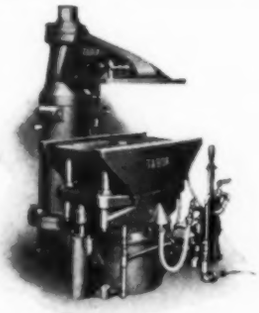
THE SAFETY GRINDING WHEEL & MACHINE CO.

Main Office and Factory SPRINGFIELD, OHIO, Phone 4651

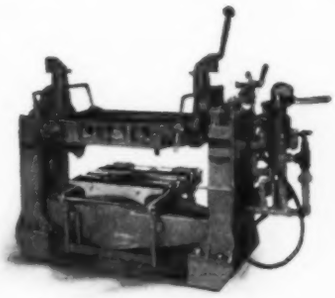
• SALES OFFICE ★ SALES OFFICE and WAREHOUSE

Established 1891

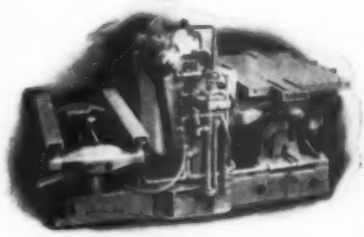
• Birmingham—3-3323 ★ Chicago—Brunswick 2000 ★ Cleveland—Cedar 9292 ★ Detroit—Trinity 1-5420
★ Erie—25-687 • Houston—Preston 2381 ★ Philadelphia—Rittenhouse 6095 ★ Pittsburgh—Court 2822
• St. Paul—Nestor 7279 ★ St. Louis—Central 3787 ★ Syracuse—2-1377



Jar Squeeze Flask-Lift Machine (Pintle Post)



Trunnion Jar Rollover Pattern Draw Machine

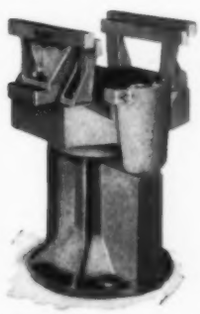


Jar Ram Power Rollover Power Draw Machine. Table slots provide for use of air-operated flask clamps.

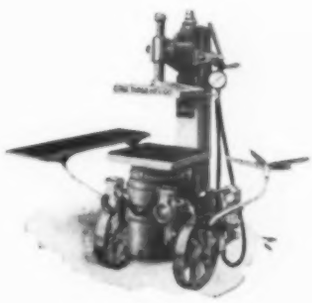
TABOR

TRADE MARK

FOUNDRY MOLDING MACHINES



Jar Flask-Lift Machine



Column Jar Squeezer

Plain Jarring Machine

Tabor Foundry Molding Machines are not new to foundrymen. We have been designing, building and adding to the line for over half a century, to keep pace with changing foundry practice. That is why we are able to say again today without fear of successful contradiction:—"Tabor offers the right type of machine for any molding need".

SQUEEZERS • JAR SQUEEZERS • HINGED ROLLOVER MACHINES • TRUNNION ROLLOVER MACHINES • JAR FLASK-LIFT MACHINES • JAR SQUEEZE FLASK-LIFT MACHINES • PLAIN-JAR AND SHOCKLESS-JAR MACHINES

. . . and TABOR-BRASIVE CUT-OFF MACHINES

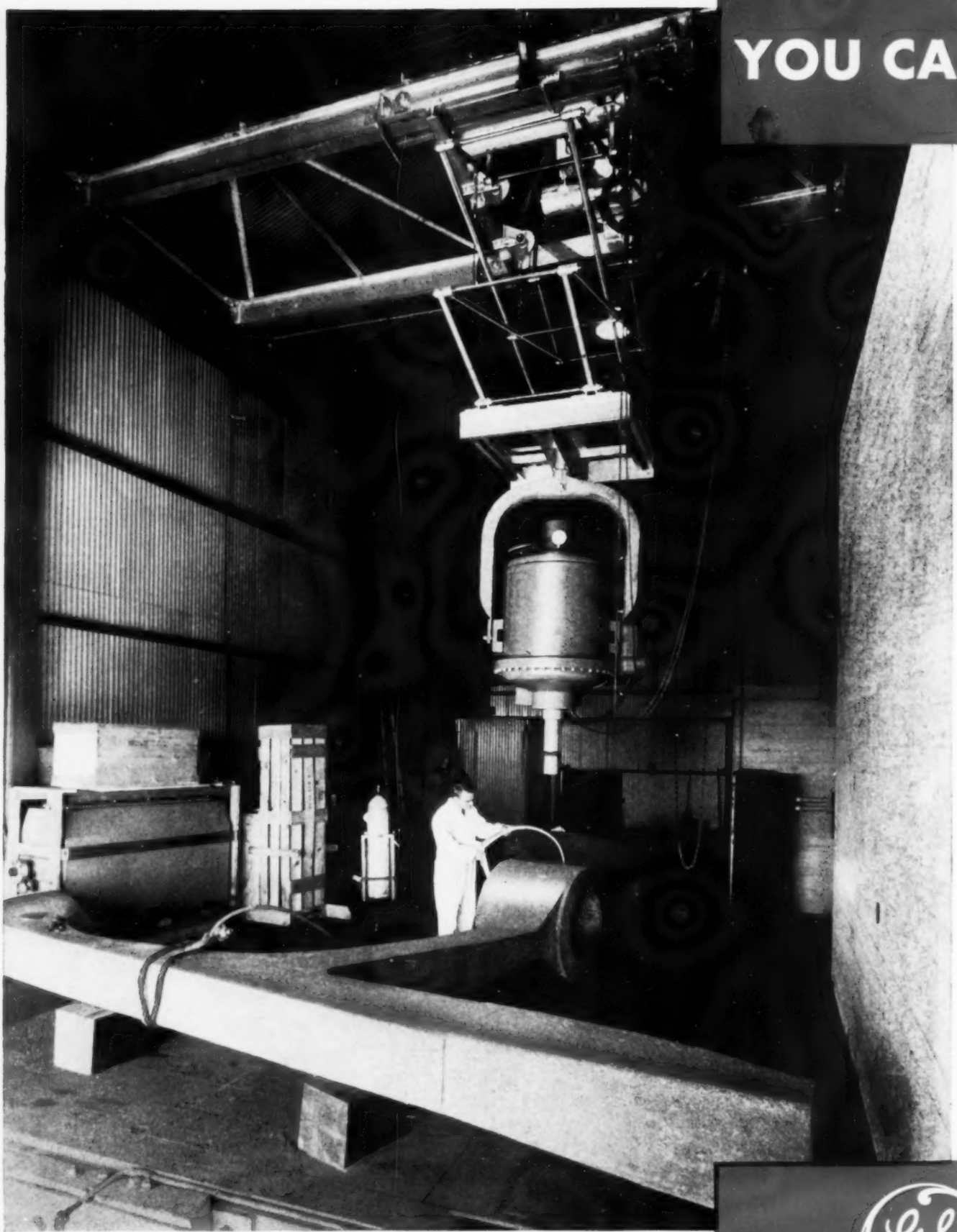
Save money, time and labor in cutting gates and risers from castings of manganese bronze, aluminum bronze, nickel, monel and other non-ferrous alloys, as well as alloy steel. Built in a complete line of sizes and types to meet any cutting need.

Write us regarding your foundry machine requirements.

THE TABOR MANUFACTURING COMPANY
6225 Tacony Street • Philadelphia • Pennsylvania

Representatives: *Los Angeles, Calif.,* Snyder Foundry and Supply Co.; *Oakland, Calif.,* Pacific Graphite Co.; *Seattle, Wash.,* Carl F. Miller & Co.

YOU CAN



WORLD'S MOST POWERFUL *is this G-E one-million volt industrial x-ray unit. Mounted on a traveling overhead bridge crane, this unit provides unusual flexibility to expedite the handling and radiography of large castings of various metal thicknesses—from one inch on up. Fast, safe, shockproof, it is but one unit of the complete line of G-E Industrial X-Ray apparatus.*

Save Time. Insure Quality. Cut Rejects.

Here's How G-E X-Ray Can Help You

G-E X-Ray offers you a complete line of shockproof, climate-proof industrial x-ray apparatus — with a full range of power of up to and including one-million volts — in a wide variety of types to meet every requirement. It also offers you the services of its corps of experienced industrial x-ray engineers who will help you select just the right unit and method to meet your particular need.

Thus, if you manufacture munitions and material vital to victory, and you require x-ray in your inspection facilities, G-E X-Ray offers you an unbeatable combination of experienced men and thoroughly-tested machines. It's a combination that you can rely on to *save time*, *insure quality*, and *cut rejects*.

G-E X-Ray men and machines will help you

SAVE TIME because G-E Industrial X-Ray Engineers — first to apply x-ray to industrial inspection more than 20 years ago — have an intimate knowledge of modern manufacturing methods and problems. There will be no guesswork about their recommendations; they'll give you facts and figures that you can rely on.

G-E Industrial X-Ray Units are plus-powered to provide fast, accurate x-ray service. Their full flexibility saves priceless operating time, and their controls are easy to operate accurately. Unlike ordinary x-ray apparatus, G-E Industrial X-Ray Units are designed and built to withstand the rigorous service expected of heavy industrial apparatus. And they'll take heavy duty cycles in their stride hour after hour, day in and day out. Whatever your x-ray need, there's a G-E unit that will take care of it best.

G-E X-Ray men and machines will help you

INSURE QUALITY because, with a G-E Industrial X-Ray Unit in your plant, you can gain the benefits of using x-ray as a guide to the development and control of improved casting techniques. An important item when you consider that improved techniques have resulted in doubling the yield from a single melt, and reducing to almost nothing the cost of replacing defective castings not quite up to standard. Quality is far more important today than ever before — and you can insure it without sacrificing production time when there's a G-E X-Ray Unit on the job.

G-E X-Ray men and machines will help you

CUT REJECTS because with a G-E Industrial X-Ray Unit you have available a reliable guide for the repair, by welding, of large expensive castings. While a single fault in the internal structure of the metal may render an expensive casting unfit for the particular use for which it was designed — the fact that you find the flaw is not a signal for discard! The x-ray film that reveals the flaw is also an accurate guide to its repair.

There are sound reasons why the majority of the nation's leading industrial concerns who use x-ray inspection have selected G-E Industrial X-Ray apparatus — reasons that you will be interested in. To get complete information about G-E Industrial X-Ray Units, call in an experienced G-E Industrial X-Ray Engineer to help you apply x-ray to your problem.

To request the services of G-E Industrial X-Ray Engineers, write or wire, today. Address your request to General Electric X-Ray Corporation, 2012 Jackson Boulevard, Chicago, Illinois. Department R35.

Films, Film-Processing Chemicals, Screens, Cassettes, and other accessories to make G-E's the world's most complete single-source x-ray supply line—available from 35 direct factory branch offices.

GENERAL ELECTRIC X-RAY CORPORATION

NEITHER HIS EYES NOR HIS SERVICES CAN BE SPARED TODAY

PROTECT HIM with American Equipment . . .

Prevent the eye injuries that take men, even temporarily, from their work. *Be sure* your workers wear the best eye protection they can get. N. F. A. and N. A. S. O. goggles — supplied to you directly by American Optical Company — provide the extra protection and comfort that your men need. These goggles have pliable, snug-fitting leather masks . . . wire-screen ventilators around the eye-cups . . . and the AO adjustable one-piece headband. Lenses are of Super Armorplate quality and can be supplied either clear or of glare-proof Calobar. Order today, from your nearest AO Branch Office.

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MELTRITE
PIG IRON
A STANDARD OF PERFORMANCE
Vital to Victory
Iron Ore, Pig Iron, Coal and Coke supplied throughout the major industrial areas.
PICKANDS MATHER & COMPANY
CLEVELAND • CHICAGO • DETROIT • ERIE • TOLEDO • MINNEAPOLIS • DULUTH • ST. LOUIS
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IRON ORE ★ PIG IRON ★ COAL ★ COKE

PATTERN PLATES
CORE PLATES
BOTTOM PLATES

STEEL Pattern Plates, Core Plates, and Bottom Plates Are Used In Foundries For Basic Reasons: They Are Durable; Economical; Practical.

Who Will Tell You More About Them? We Will, Of Course. Or Ask Any Foundry Near You.

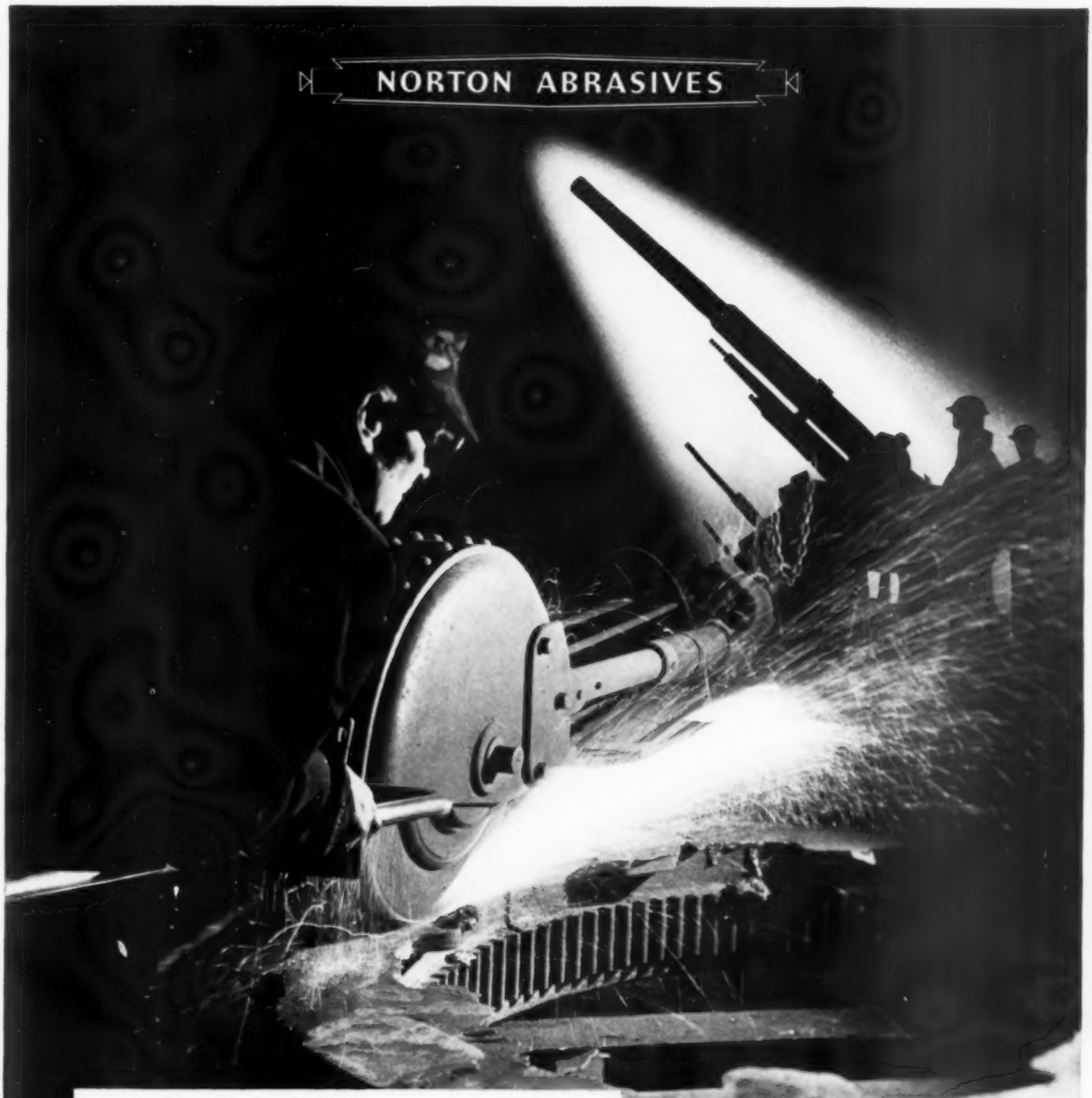
MOLTRUP STEEL PRODUCTS CO.

BEAVER FALLS, PA. (Pittsburgh District)

STEEL PLATES LAST FOR YEARS

MOLTRUP

NORTON ABRASIVES



GUNS and more guns—tanks and more tanks—they're an absolute necessity today and so is maximum production in every foundry making parts for them. And when maximum production is a necessity you can depend on Norton Resinoid Wheels. They were developed by Norton research especially for foundry work. Special treatments of the abrasive and special resinoid bond formulae combine to give wheels that are fast cutting and that can stand up under the rigors of foundry use.

W-869

NORTON COMPANY
Worcester, Mass.

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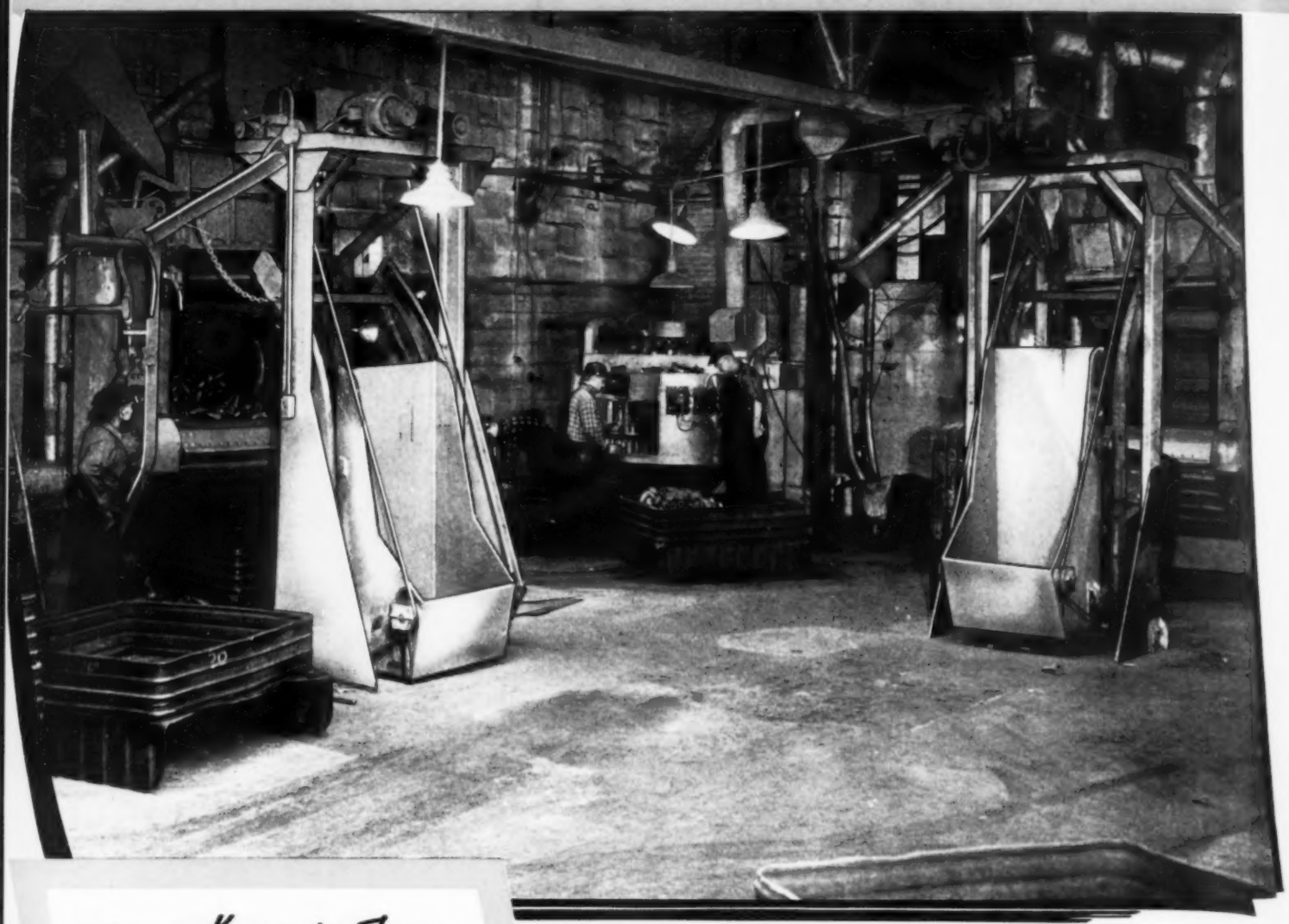
(ABRASIVE PAPER AND CLOTH)

WHEN IT'S AN ABRASIVE PROBLEM, CALL IN NORTON ENGINEERING

Helping AMERICA Speed the

with WHEELABRATOR



How to *Keep in Tune* WITH THE LATEST DEVELOPMENTS IN METAL CLEANING

Read the American WHEELABRATOR DIGEST, a bi-monthly publication crammed full of helpful ideas and information on metal cleaning problems. We will be glad to add your name to our mailing list.

DO YOU KNOW THAT

Wire brushing operations on small brass castings were entirely eliminated at Watts Regulator Co., Lawrence, Mass., because the 15″ x 20″ WHEELABRATOR Tumblast cleaned these parts so thoroughly.

●

The Acme Steel & Malleable Iron Co., Buffalo, N. Y., found that they could clean malleable insulator bells and brackets in their 48″ x 42″ WHEELABRATOR Tumblast in five minutes, whereas with their air blast equipment 25 to 30 minutes had been required.

●

The WHEELABRATOR will throw more abrasive—and throw it harder, per horsepower expended, than any other blasting device ever conceived.

In less than 5 hours' cleaning time, approximately 22 tons of gray iron textile machinery parts are cleaned in the 48″ x 42″ WHEELABRATOR Tumblast at The Draper Corp., Spartansburg, S. C.

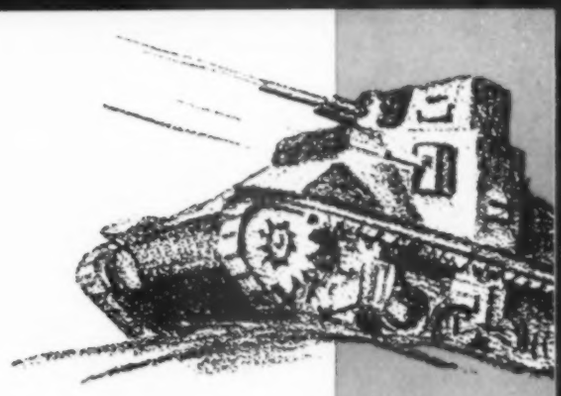
●

223,500 lbs. of miscellaneous gray iron castings were cleaned in the first 18 days' operation of the 36″ x 42″ WHEELABRATOR Tumblast at Stedmans Foundry & Machine Co., Aurora, Indiana.

●

All WHEELABRATOR Tumblasts use the exclusive American endless apron conveyor which completely exposes all surfaces of every piece to the full effect of the abrasive blast.

Day of VICTORY Speed Cleaning



HERE'S HOW IT'S BEING DONE *with the* AIRLESS WHEELABRATOR

TIME *is Saved*—In America's march to Victory every minute saved this year will be worth many more next year. The WHEELABRATOR saves precious minutes and hours on every cleaning job it has ever tackled. Time savings are effected after cleaning, too, because inspection is simplified, and machining and grinding operations are speeded up, due to the sand-free quality of WHEELABRATOR cleaning.

POWER *is Saved*—The increased tempo of war production is a serious strain on the nation's electric power capacity. The WHEELABRATOR effects important savings in horse power—often as high as 80%.

TOOLS *are Saved*—WHEELABRATORS clean products so thoroughly that cutting tools require less frequent grinding. One company, for example, found the life of its cutting tools had increased 300%.

LABOR *is Saved*—WHEELABRATORS require fewer operators, thus releasing manpower for other work.

SPACE *is Saved*—Expanding war production often entails increased plant construction, but WHEELABRATORS minimize cleaning room space not only because they are compact but because they handle more volume per machine in a given period of time.

MATERIAL *is Saved*—Breakage is a bugaboo at any time, especially now, because it means wasted effort and reduced output. With a WHEELABRATOR this difficulty is reduced to a negligible minimum.

EQUIPMENT *is Saved*—A single WHEELABRATOR invariably does the work of a number of machines; and every replacement means important savings in equipment, piping and maintenance. In replacing pressure blast equipment alone the WHEELABRATOR eliminates such items as: air compressors, compressor motors, pressure tanks, mixing chambers, air receivers, hose, valves, etc.

TYPICAL CASTINGS BEING CLEANED BY WHEELABRATOR FOR WAR PRODUCTION

AIRCRAFT

- Engine cylinders
- Valves
- Aluminum castings
- Bomber Wheels
- Fittings
- Parachute Castings
- Supercharger parts
- Master rods

ARMAMENT

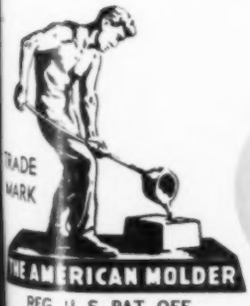
- Shells
- Bombs
- Gun parts
- Shell caps
- Gun mounts
- Trench mortars

TANKS

- Armor plate
- Transmission parts
- Cylinder blocks
- Bearings
- Pistons
- Valves

NAVAL

- Armor plate
- Anchor chain
- Engine parts
- Gyroscopes



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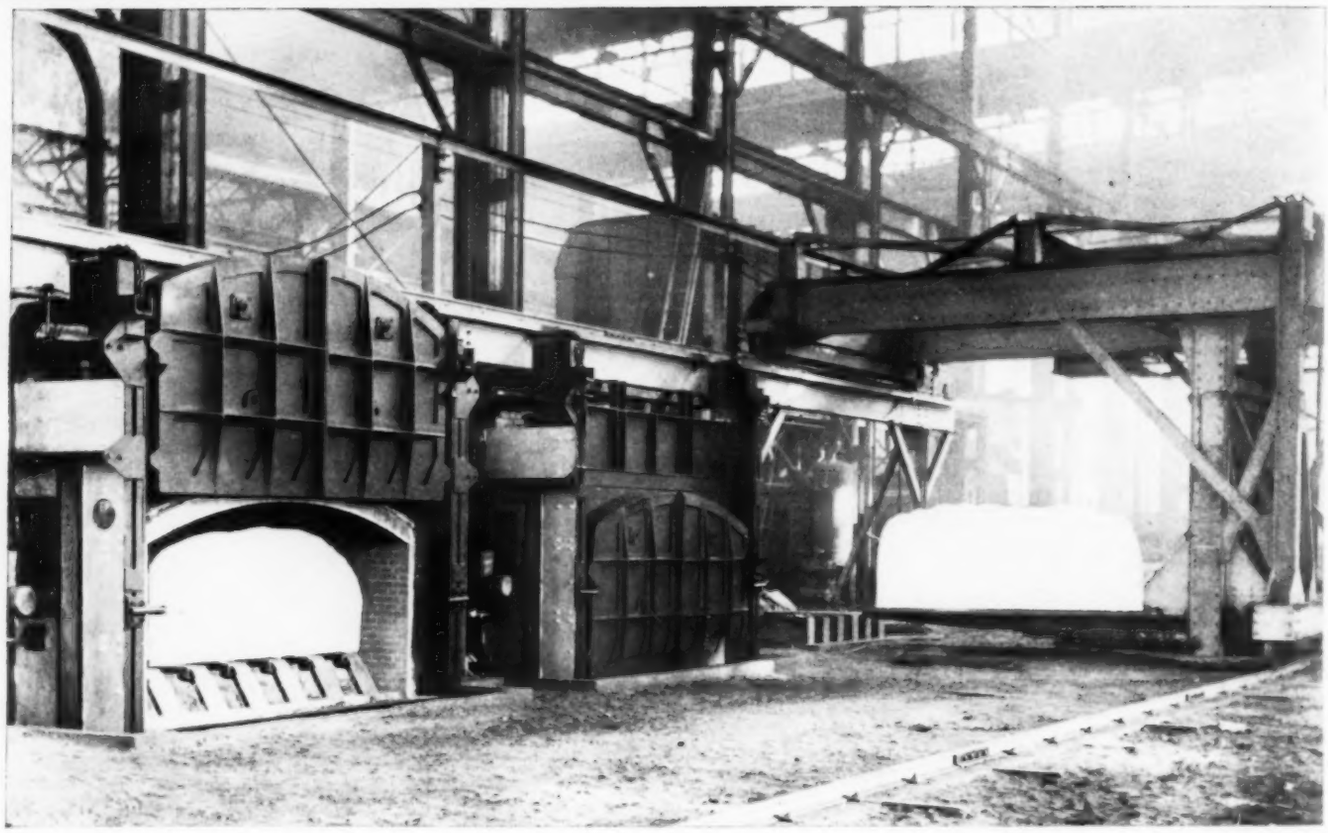
AMERICAN FOUNDRY EQUIPMENT CO.

505 S. BYRKIT ST. MISHAWAKA, IND.

EF FURNACES

For Every Industrial Heat Treating Process



Heavy Tank Armor Castings

are Heat Treated in EF Furnaces Similar to the Above

Extra large castings and other products of various dimensions and weights are handled in EF furnaces of the above type.

The special gantry type crane picks up the entire load, deposits it in the furnace and withdraws. After the heating cycle is completed, the crane quickly removes the charge from the furnace to the oil or water quench or directly to the unloading platform depending on the treatment required.

Another recent oil fired layout consists of nine similar furnaces. One 14,000 lb. capacity special EF gantry crane serves the entire battery. These furnaces are arranged for high and low temperature operations ranging from 750°F. to 2000°F. Each of the high temperature furnaces has capacity for heating a 10,000 lb. charge to 2000°F. in 3 hours.

ELECTRIC EF FURNACES FUEL FIRED

We specialize in building Production Furnaces — Oil Fired, Gas Fired and Electric.

Other outstanding EF production installations include furnaces for heat treating shell forgings, cartridge cases, bomb and gun parts, machine gun cartridge clips, aircraft and aircraft engine parts and many other allied products.

The Electric Furnace Co., Salem, Ohio

Gas Fired, Oil Fired and Electric Furnaces---For Any Process, Product or Production

Cleveland Convention Finds Industry Ready for Total Service in a Total War

MARKED success of the recent Cleveland convention and exhibition of the American Foundrymen's Association should be a source of considerable gratification to every member, and especially to the officers, directors, staff officers, and the various committee members, whose efforts made the meeting possible. Perhaps the greatest surprise to many was the near record registered attendance, which proves again that the leadership of the foundry industry is intent upon the single goal of maximum service to the war effort.

The exhibition of foundry equipment and supplies was excellent and should serve to speed production of castings in plants already engaged in war work. At the same time the combination of war castings exhibits and the equipment and supply show should aid some plants in the problems of converting to war work. Difficulties in not having available large quantities of heavy equipment for display were overcome unusually well by employing a wide variety of methods for describing the latest production methods.

In addition to the most extensive program of technical papers ever provided for an annual meeting of the A.F.A., several sessions were devoted to the discussion of certain phases of war production, and the problems facing an industry in time of war. It is to be regretted that these meetings were not exceptionally well attended, due perhaps to the lack of interest or conflicting events, for importance of the subjects discussed cannot be emphasized too strongly. Activities of the association have grown so extensively in size and importance in recent years that it is becoming exceedingly difficult to find sufficient time to cover all of the many ramifications at each annual convention. Perhaps concentrating the convention program upon fewer of the association activities and rotating some of the sessions from year to year may provide more time for the discussion of pressing industry problems, whether they be related to war or the production of castings in time of peace.

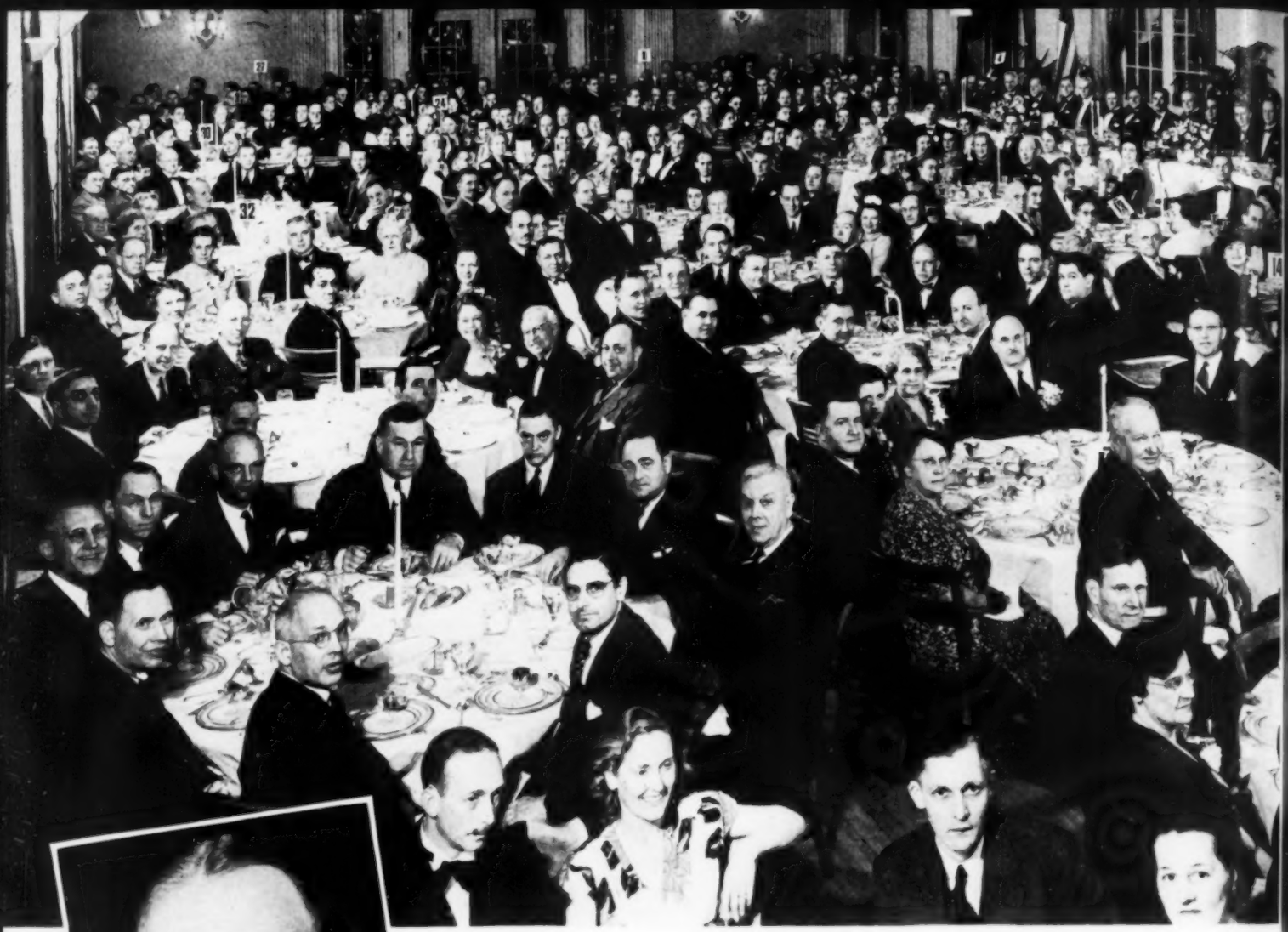
Discussions during the convention indicate the foundry industry is faced with pressing problems. While steel foundries, heavy gray iron shops, and aluminum and magnesium plants making castings for usage in aircraft are unable to keep up with war demands, many light gray iron shops are tapering off, due to inability to convert to war work or to get raw materials for production of civilian goods. As yet those in charge of government design and procurement have hesitated to admit that properties of gray iron castings are entirely suitable for many applications where other, more critical products now are being used. Maj. Gen. L. H. Campbell Jr., chief of production, Ordnance Office, Washington, told the association at the opening meeting that the contribution of the foundry industry to the war effort is one of the most important and most telling of any industry. These are encouraging words, but the industry stands ready to do a much bigger job if given the opportunity.

Convention week also saw the further tightening of restrictions on ferrous foundries not working on war castings. An amendment to Preference Order M-21 to include gray iron and malleable castings as well as steel, will limit deliveries of ferrous castings after May 15 to preference ratings A-10 or higher. This order also places the same limitation on deliveries of pig iron, so that foundries cannot receive pig iron on B preference ratings. A new PD-69 form also has been introduced which requires a more complete breakdown on preference ratings. With iron and steel scrap under allocations, iron and steel foundries now can operate only on A preference ratings.

In addition to supplying knowledge and inspiration to the leaders of the industry, the Cleveland convention and exhibition demonstrated to the many government representatives present the willingness of the foundry industry to do everything in its power to bring an early victory for the United States.

Frank G. Steinebach

Editor



Duncan P. Forbes
President

Lee C. Wilson
Vice President

PROBLEMS pertaining to increasing production of castings for the American war effort practically monopolized most activities of the annual convention of the American Foundrymen's Association held in Cleveland, April 20 to 24. A record attendance of leaders of the foundry industry from all parts of the country, an exceptionally heavy program of production meetings and technical sessions, and an unusual exhibition of foundry equipment and supplies, were high spots of a most successful convention. During the five day meeting approximately 10,000 foundrymen gained inspiration in the speeding of war materials manufacture through participation in the various phases of the foundry week program.

The convention and the First Western Hemisphere Foundry Congress were opened officially at 11 o'clock Monday morning by Herbert S. Simpson, president of the A.F.A. Mr. Simpson stated that the congress was designed primarily to further the war effort. He declared that a review of the technical program arranged for convention week would indicate the effort which had been made by every one connected with the association to make the convention a success and to offer all possible aid in war production. Mr. Simpson stated that to win the war every one must concentrate all effort to that end, and that advantage must be taken of all possible sources for the production of war and allied materiel. President Simpson also welcomed visitors from other countries and called attention to the fact that the congress provided a

A·F·A Convention gives impetus to WAR PRODUCTION

further indication of the solidarity of North and South America.

The president then introduced Mayor Lausche of Cleveland who welcomed the visitors to the convention city. The mayor expressed the opinion that those attending the convention would more than make up for the time lost in production, because of the greater knowledge gained. Our task and responsibility are to bring victory at an early date, he declared, and therefore it is well for us to question ourselves as to whether we are doing our best to accomplish that purpose. With the world looking to America for salvation, it is necessary for all to do their utmost in furthering the war effort.

President Simpson then called on Frank G. Steinebach, THE FOUNDRY, Cleveland, who presented resolutions instructing the secretary to send greetings to the various Western Hemisphere countries participating in the convention, and messages of greetings and a pledge of co-operation in the war effort to the Institute of British Foundrymen and the Australian Foundrymen's Association.

Duncan P. Forbes, president elect of the asssociation, introduced Col. H. M. Reedall, Cleveland Ordnance district, U. S. Army Ordnance, who stated that his department was more interested in foundrymen and their products than might appear on the surface. At all times an endeavor is made to use products of the foundry as much as possible, and designs now are being reviewed to take advantage of foundry processes that have been developed in recent years.

Col. Reedall said he was fortunate in being able to present to the audience Major General L. H. Campbell Jr., chief of production, Ordnance Office, Washington. In a stirring talk, General Campbell sketched the great differences between the First World war and the present one, and stated that the contribution of the foundry industry to the present war effort is one of the most important and one of the most telling of any industry. While the ordnance department's attention had in the past turned to other methods of fabrication, the foundry again is coming back into its own. General Campbell emphasized that this country is in for the fight of its life, and that the next few months would be important. Every one must make sacrifices, and stop playing politics.

Annual business meeting of the association was held Wednesday morning in the ballroom of the Public Auditorium. Previous to presenting his presidential address President Herbert S. Simpson made a motion which was seconded and carried that a resolution be drawn up stating that the American Founddrymen's Association and its membership is giving whole hearted support to the War Production Board and Donald Nelson, its chief.

President Simpson pointed out that since Dec. 7 all are engaged in a united effort to support our way of living against aggressors. This war is one of materials and forms a challenge to the foundry industry which means that we must do our part to meet

A·F·A CONVENTION

it. He said that in 1942 the industry would produce more than 15,000,000 tons of castings through the efforts of about 750,000 employes.

Two activities which the association has underway for the benefit of industry are cupola research and the castings promotion program. He said that membership in the association was approaching its 1942 goal of 5000 members, and during the convention a petition had been granted to the twenty-third chapter designated as the Eastern Canada and Newfoundland Chapter. Following his address he called upon C. E. Westover, executive vice president of A.F.A. for his report.

Mr. Westover expressed his appreciation to his staff associates, and said that membership under the able direction of B. D. Claffey, chairman, had

increased from 4168 to 4846. Two new chapters had increased the total to 23. Technical committees of the association have been functioning actively, holding 64 meetings with over 500 members attending. New publications brought out during the year are *Modern Core Practices and Theories*, by Harry W. Dietert, and *Code of Recommended Practices for the Protection of Life, Property and Production in the Foundry Industry During the War.*

Robert E. Kennedy, secretary of A.F.A., as provided by the constitution, cast a unanimous ballot for the election of the officers for the coming year. They are as follows: Duncan P. Forbes, Gunite Foundries Corp., Rockford, Ill., president; Lee C. Wilson, Reading Steel Casting division,

A·F·A CONVENTION

American Chain & Cable Co., Reading, Pa., vice president; directors for 3 years—J. E. Crown, U. S. Naval Gun Factory, Washington; Herbert S. Simpson; I. R. Wagner, Electric Steel Castings Co., Indianapolis; S. V. Wood, Minneapolis Electrical Steel Casting Co., Minneapolis, and Walton Woody, National Malleable & Steel Casting Co., Sharon, Pa. To fill the unexpired term of the late W. J. Corbett, the board of directors elected Vaughan Reid, City Pattern Works, Detroit to the board. Mr. Kennedy also announced that the prenominating committee, composed of Carl Morken, C. E. Sims, and W. G. Reichert, proposed the following to serve with the three last living past presidents on the nominating committee for 1943: John W. Porter, American Steel Foundries, East Chicago, Ind.; H. M. St. John, Crane Co., Chicago; John Lowe, Battelle Memorial Institute, Columbus, O.; and Ralph Teetor, Cadillac Malleable Iron Co.,

Cadillac, Mich. These men will meet prior to the 1943 convention.

Lester N. Shannon, Stockham Pipe Fittings Co., Birmingham, Ala., and chairman of the board of awards, announced the presentation of life memberships to R. M. Allen, Pat Dwyer, and H. S. Simpson, and then presented the Penton gold medal to John E. Galvin, Ohio Steel Foundry Co., Springfield, O. Hyman Bornstein, Deere & Co., Moline, Ill., presented the Whiting gold medal to A. L. Beogehold, General Motors Research Laboratories, Detroit.

Due to the unavoidable absence of Rear Admiral C. H. Woodward, his assistant Lt. Commander Samuel J. Singer, U. S. Navy, Washington, spoke on the necessity of plant protection and defense. He called attention to the fact that the Middlewest is vulnerable to air attack, and must get ready as quickly as possible for prevention of damage from

A·F·A CONVENTION

sporadic raids. Making the first attack unprofitable for the enemy would lessen the repetition. In any event it is necessary to minimize the damage. Each plant must stand on its own feet as far as protection is concerned, and not depend upon the community. However, the plant should tie in with the community's local control system by direct communication. Through that means the plant would receive the first warning so that proper precautions could be taken.

Plant protection and defense should be placed under the direction of one man who would have charge of police, fire, medical and other protective squads. For efficient application of any protection schemes, the management must secure co-operation of the employes. Commander Singer pointed out that the Office of Civilian Defense only offers suggestions on methods which have to be adapted to fit each particular case. According to the speaker, it is not necessary to erect bomb proof shelters, but to select the safest area in the plant for employe protection during a raid. Blackout orders must be followed. That does not mean necessarily that all lights must be out. If they are not visible from above they may be lighted. Plant protection is a necessity if all possible aid is to be given to our soldiers and sailors who are carrying the battle to the enemy.

A general picture of the foundry industry of Brazil and Mexico was outlined by the papers presented at the Western Hemisphere Foundry Conference. This session of the association's first Western Hemisphere Foundry Congress had Harold J. Roast, Canadian Bronze Co. Ltd., Montreal, as its chairman and J. S. Vanick, International Nickel Co., New York, as co-chairman.

Improvement in foundry practice in both Brazil and Mexico is complicated not only by problems relating to raw materials but also (*Please turn to page* 139)

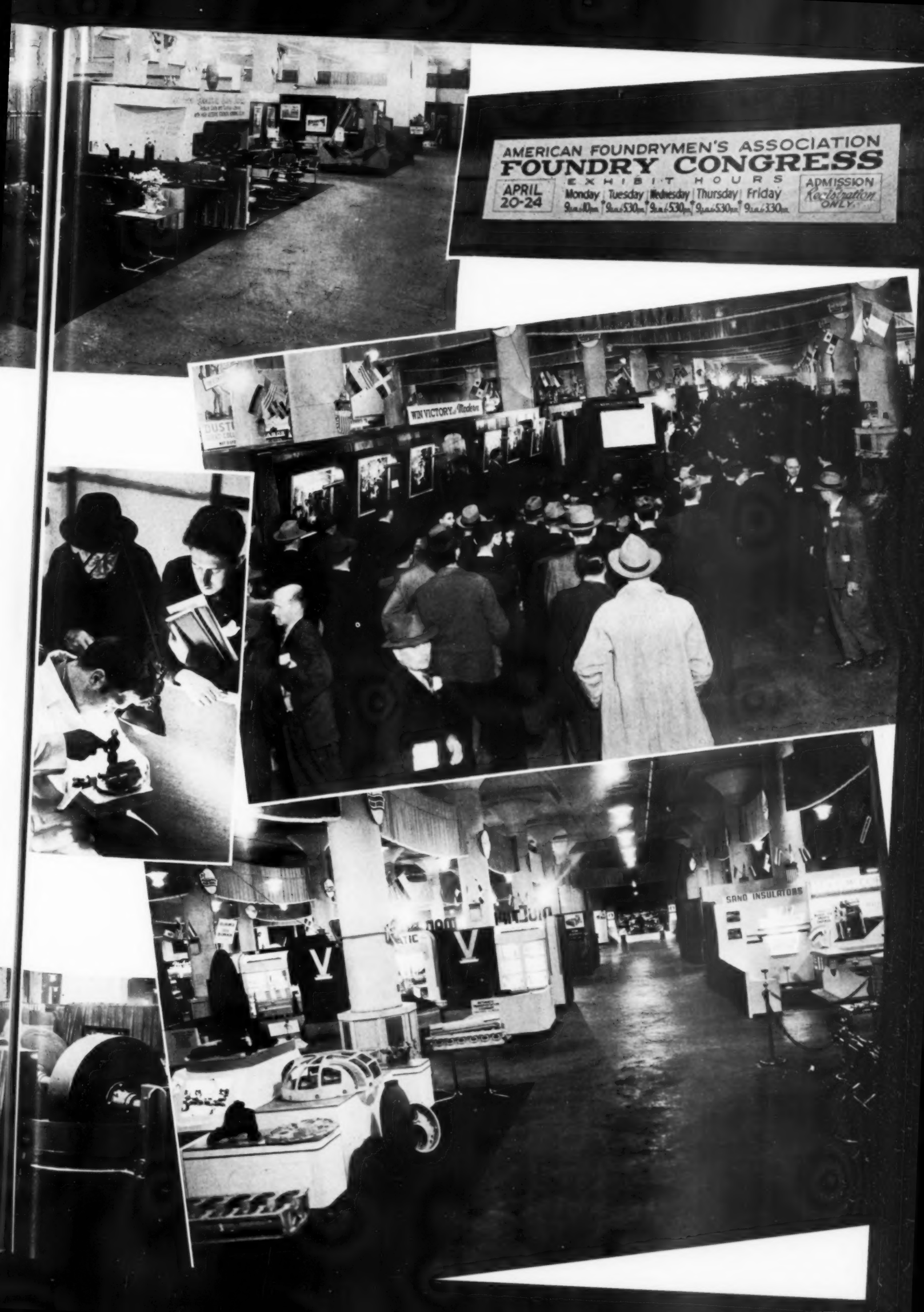
Splendid Show points way to greater output

THE exhibition of foundry equipment and supplies, held in the Public Auditorium in Cleveland, April 20 to 24, in conjunction with the annual convention of the American Foundrymen's Association, gave approximately 10,000 foundrymen a graphic story of modern foundry machines and materials, all adapted to speeding the production of both ferrous and nonferrous castings for war. Considering all factors, a surprising amount of equipment, especially smaller types of machines, was on display. Difficulties encountered in showing large quantities of heavy equipment proved no handicap, for exhibitors employed great ingenuity in providing other means of illustrating war production methods. Models of equipment, motion pictures, enlarged photographs and drawings were some of the aids included in the presentations. At the same time an important part of the job of transmitting information fell to the experienced representatives of various exhibiting companies and they were kept busy throughout the week.

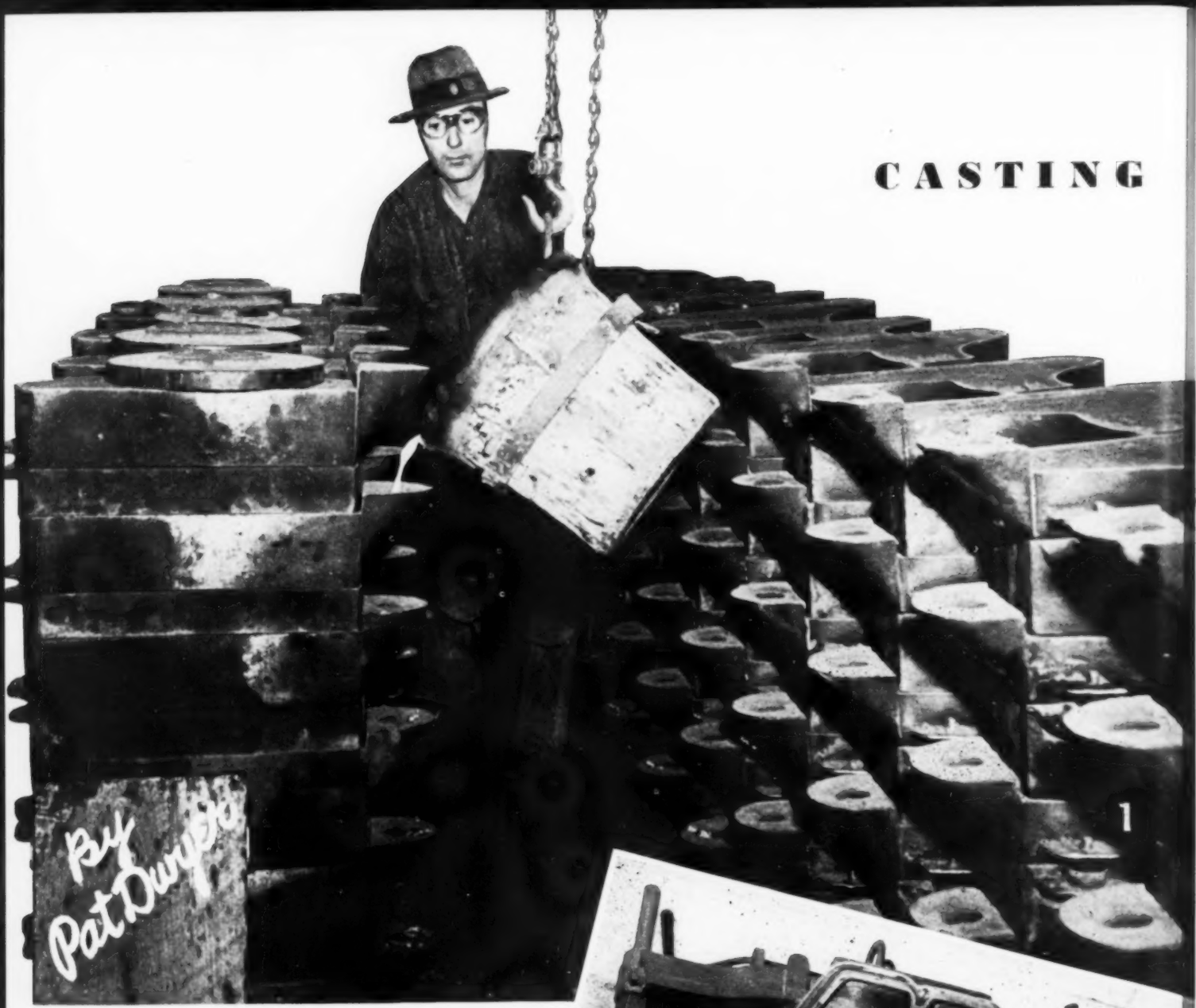
The entire field of foundry equipment and supplies was well represented among exhibitors, with the total number of displays probably equalling that of previous foundry shows. While numerous new developments in both machines and materials were featured, the tremendous demands facing equipment and supply manufacturers have made it necessary for them to devote practically all effort to production, so that little time can be spent on development work other than that required to meet specific new problems in making castings for war machines.

An atmosphere of war permeated the entire exhibition. A large number of castings were on display in various parts of the exhibition hall through the co-operation of a number of generous foundries and the various branches of the service. Tractors, trucks, combat cars, jeeps and models of other material added atmosphere.

The operating pattern shop and molding floor provided by the Cleveland (*Please turn to page* 177)


AMERICAN FOUNDRYMEN'S ASSOCIATION
FOUNDRY CONGRESS
EXHIBIT HOURS
APRIL 20-24
Monday 9 a.m. to 10 p.m.
Tuesday 9 a.m. to 5:30 p.m.
Wednesday 9 a.m. to 5:30 p.m.
Thursday 9 a.m. to 5:30 p.m.
Friday 9 a.m. to 3:30 p.m.
ADMISSION by Registration ONLY
WIN VICTORY
SAND INSULATORS

CASTING P



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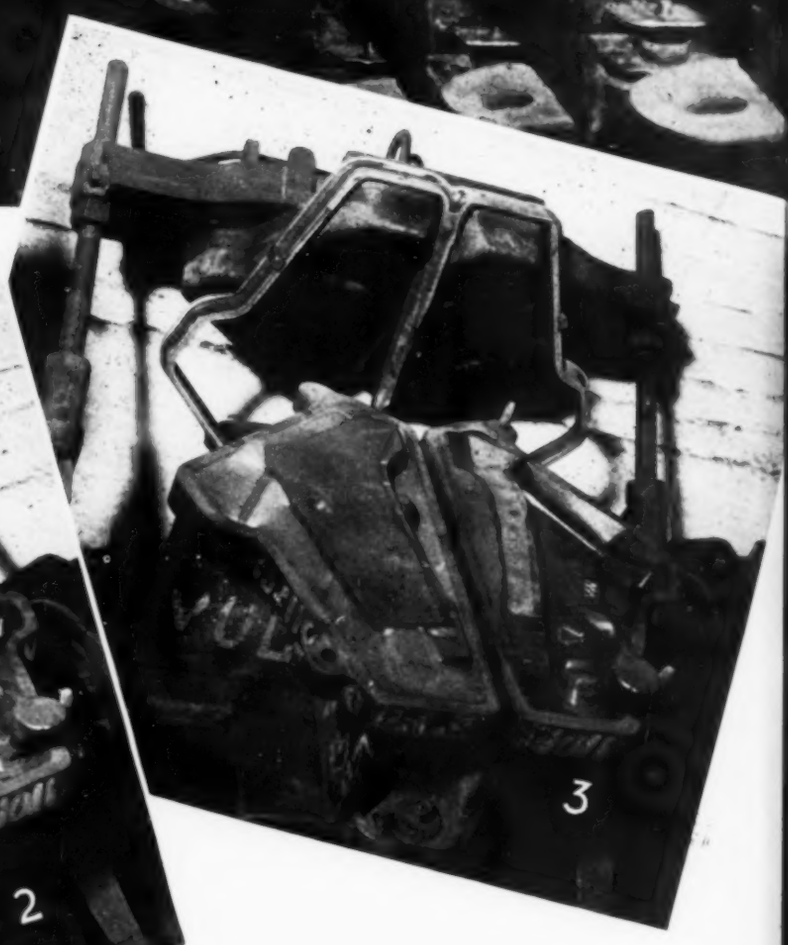


3

PLOW PARTS and PIPE FITTINGS

SHARP tongued Thaddeus Stevens, combination gad fly and fire brand of the administration at Washington during the reconstruction period following the Civil War, is credited with many a shrewd, pointed and at times acid edged thrust at parasites, pirates and incompetents in the verbal sword play cultivated to a high state of perfection in a singularly appropriate and hot house atmosphere.

All his oratorical effort was not devoted to blitzkrieging actual and potential personal and public enemies. One of his most remarkable declarations did not appear until after his death. He wrote his own epitaph and had it cut deep into the face of a huge granite block from his own native Vermont, and erected above his grave in a quiet Lancaster, Pa., cemetery:

"I repose in this quiet and secluded spot, not from any natural preference for solitude, but finding other cemeteries limited as to race by charter rules, I have chosen this that I might illustrate in my death the principle which I advocated through a long life. Equality of man before his Creator."

Irrespective of minor artificial barriers which separate individuals or classes, all men are alike and equal from the cradle to the grave in one respect, the absolute necessity of absorbing food. Quantity and quality may vary over a wide range, but the inescapable fact remains that unless one eats, he dies.

A little further pursuit of the same thought leads to the conclusion that all forms of human food come either directly or indirectly from the earth.

Under the terms of an ancient injunction laid down in the Garden of Eden, man must eat his bread in the sweat of his brow. Translated freely this means that man has to cultivate the ground before he can gather the product to sustain life. Methods of doing the work have changed to some extent over the centuries, but the basic principle is essentially the same as it was in Kipling's *Jubal and Tubal Cain*: Jubal sang of the wrath of God and the curse of thistle and thorn, but Tubal got him a pointed stick and scrabbled the earth for corn. Old, old as the earthly mold, young as the sprouting grain; yearly green is the strife between Jubal and Tubal Cain.

The primitive pointed rod still is used in primitive and isolated areas, but has been replaced nearly all over the world by the well known metal pieces of equipment. Modern methods of production and distribution have concentrated manufacture in a comparatively small number of establishments of which the Lynchburg Foundry Co., Lynchburg, Va., is a prominent example.

This old established firm operates two plants, one at Lynchburg, devoted to the manufacture of plows,

Fig. 1—Plow point molds are stacked six high to conserve floor space. Fig. 2—Pattern with flange in the up position. Fig. 3—Pattern with flange stripped through the pattern plate. Fig. 4—Molds for pipe flanges and other flat castings are stacked for pouring. The bottom of each drag section serves as a cope for the mold underneath

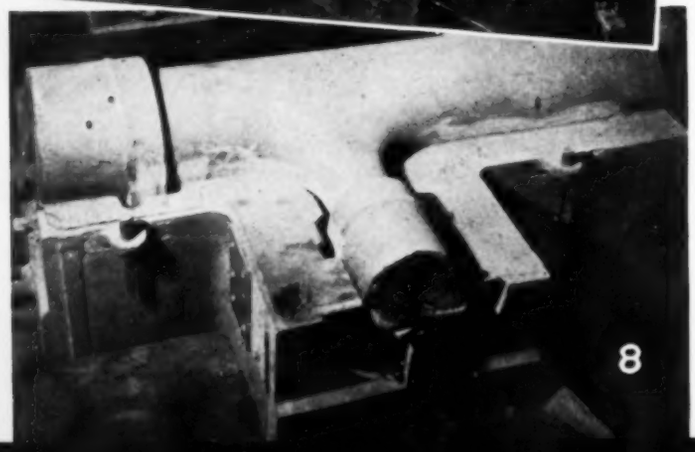


Fig. 5—Flasks, bottom boards and chills are stacked at the right. Figs. 6, 7 and 8—Cores and molds for pipe fittings are green sand. Fig. 9—A mold board chill showing core prints and space for green sand. Fig. 10—Cope and drag for mold board casting. The flask is hinged at one end. Fig. 11—Floor of mold boards set up in pouring position. Fig. 12—One of the plow point floors with empty flasks and chills at the right. The steel bucket in the center transports the castings to the cleaning room

pipe fittings and a wide miscellany of small and medium weight gray iron castings. In the other plant located at Radford, Va., large castings in wide range of weight and size are made in dry sand and loam molds. Interesting features of this plant will be presented in a later article. The present description is limited to the Lynchburg plant.

The following brief summary will satisfy the requirements of the reader, whose reading for any one of a number of reasons is confined to a quick flick through the illustrations.

Figs. 2 and 3 show one of the plow point molding machines. A trigger device lowers and raises the flange through a slot in the plate. This flange is set at an angle. Fig. 2 shows this flange in the up position where the pattern is ready for the drag. Fig. 3 shows the flange in the down position so that the drag may be lifted from the plate. An aluminum strike off frame is shown hanging over the pressure blocks which conform approximately to the contour of the pattern. Fig. 4 shows a portion of the molding machine section with the cupola showing dimly in the center background. This figure also shows flasks for the molding machines, and method of pouring the metal.

Fig. 5 shows part of the flat molding section. Flasks, bottom boards and chills at the right are stacked for the molder. Two floors partially put up

show the position of the stacks, with a ladle suspended above the center of the area. Fig. 9 shows one of the mold board chills in a vertical position as left by the clean up man who also shellacs the working face. The backs of a row of chills on the next floor appear in the background.

Fig. 10 shows a mold board chill with green sand rammed in the space around the edge and with small bolt cores set. The pouring basin is on the bottom left side of the cope and the sprue connects with the runner on the right side of the mold impression in the cope. When the mold is turned up on edge for pouring, the gate entrances are on the bottom.

Fig. 11 shows two rows of mold board molds in pouring position. Fig. 12 shows a section of the molding machine area with one row of chills as they are left by the sand cutter. The photograph was taken when only half of the floor had been utilized. The bucket hanging above the sand heap is for transporting the castings to the cleaning room. Fig. 1 is a close up view of an operator pouring iron into the molds. Figs. 6, 7 and 8 show a few of the wide range of pipe fittings made on molding machines. The green sand cores are rammed by hand in two part coreboxes.

For the reader with more time, interest or curiosity, or possibly all three, the following presents many details of methods, equipment and materials.

One section of the building is devoted to the production of plow point castings on a number of hand squeeze molding machines made by the Adams Co., Dubuque, Ia. A fair general idea of the molding practice may be gathered from an examination of the illustrations, Figs. 2 and 3. Each machine is mounted on wheels which enable the operator to push it along, keeping close to his diminishing sand pile and minimizing the distance he has to carry each mold from the machine to the floor.

Construction of the pattern plates and method of mounting them on the machine also are shown in Figs. 2 and 3. The plates are cast iron 1½-inches in thickness, accurately machined and fitted. They are provided with suitable pins and pin holes to correspond with these features on the flasks. Flask joints are planed top and bottom. Cope and drag plate are mounted side by side on each machine. The cope pattern at the left is perfectly plain. Edges of the pattern are drafted generously to provide a clean lift.

Arrangement of the drag pattern at the right differs to some extent. Flange on the pattern is set at an acute angle. In (*Please turn to page* 194)

Inspecting

SAND CASTINGS

for Aircraft

By WALTER RODGERS
Chief Inspector
Bendix Marine Division
Bendix Aviation Corp.
Brooklyn, N. Y.

DEMAND for lighter materials of high strength and good fatigue endurance continues to increase. Modern engineers, in trying to keep weight and size to a minimum, are designing castings having odd and intricate shapes. With all the thought and time devoted to eliminating as much weight as possible on parts for aircraft equipment, it is necessary to go further than the drafting room to insure conformance to specifications. Proper inspection is an important factor in controlling production of good sand castings for the aircraft industry.

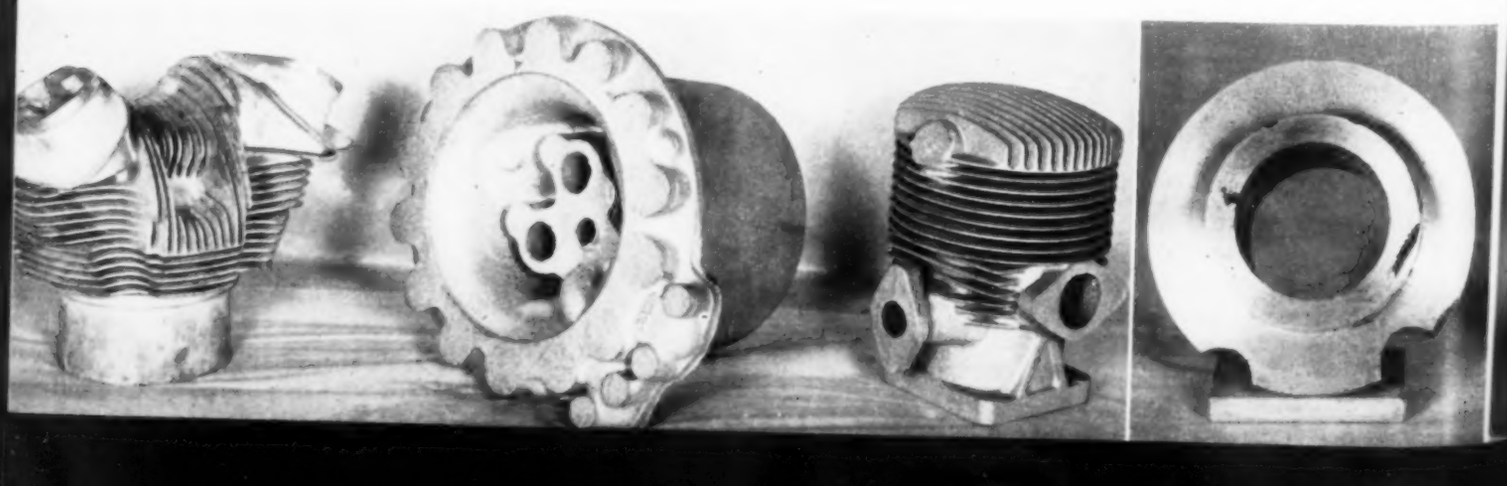
Location of the gates, risers and chills; physical properties of the molding sand and cores used; ramming of the mold; shape of the part; type of alloy and pouring temperature of the alloy, are only a few factors influencing homogeneity of the resultant casting. Frequently, if these factors are not controlled and co-ordinated properly, a defective product may result. Some castings may be rejected for various reasons during machining operations, while others, if not properly inspected, may fail in service from causes not discernible during inspection. When the latter occurs, not only is the cost of the part and the subsequent damage to the assembled unit involved, but the integrity of the manufacturer is impaired.

A former method of testing correctness of foundry procedure and quality of molded parts was to section sample castings. This was an expensive method, if used to complete satisfaction, even when carried to practical limits. However, there has been and always will be a question as to the thoroughness of the method. First, the information obtainable is almost directly proportional to the number of cuts or fractures made, and, second, there is the possibility that the accepted castings may contain some porosity or other defect not present or overlooked in the pieces examined. With these limitations, it is necessary to adopt a more reliable nondestructive method of test.

Soundness and continuity of the metal now is checked by x-ray or radium gamma ray. The radiographic method of inspection plays an important role in checking castings. On highly stressed parts a sound casting is imperative as failure may occur from internal flaws which are not exposed to visual inspection. Using the x-ray tube, a shadow-graph of the various sections is recorded on a film. Any internal flaws are readily shown as light or dark areas on this film. If the defect is less dense or lower in atomic weight than the metal, it will be shown as a dark area. If the defect is more dense or higher in atomic weight, it will be shown as a light area. An experienced technician can study the film and determine the size, location, type and seriousness of any defects. With the x-ray, defects such as blow holes, tears, shrinks, cracks, piping, gas cavities or inclusions are quite readily shown in any accessible section.

Radiograph also is used to improve casting technique and foundry practice. Several methods of gating and chilling can be tried in a short time at a relatively low cost. By checking the result of each change with the x-ray, the best method for producing a sound casting can be determined easily. Size of chills used and their relative position to gates and risers are important factors in determining the amount of pinhole porosity. Suitable changes of risers, gates and chilling will eliminate this condition to a great extent.

Hardness of the castings (*Please turn to page* 192)



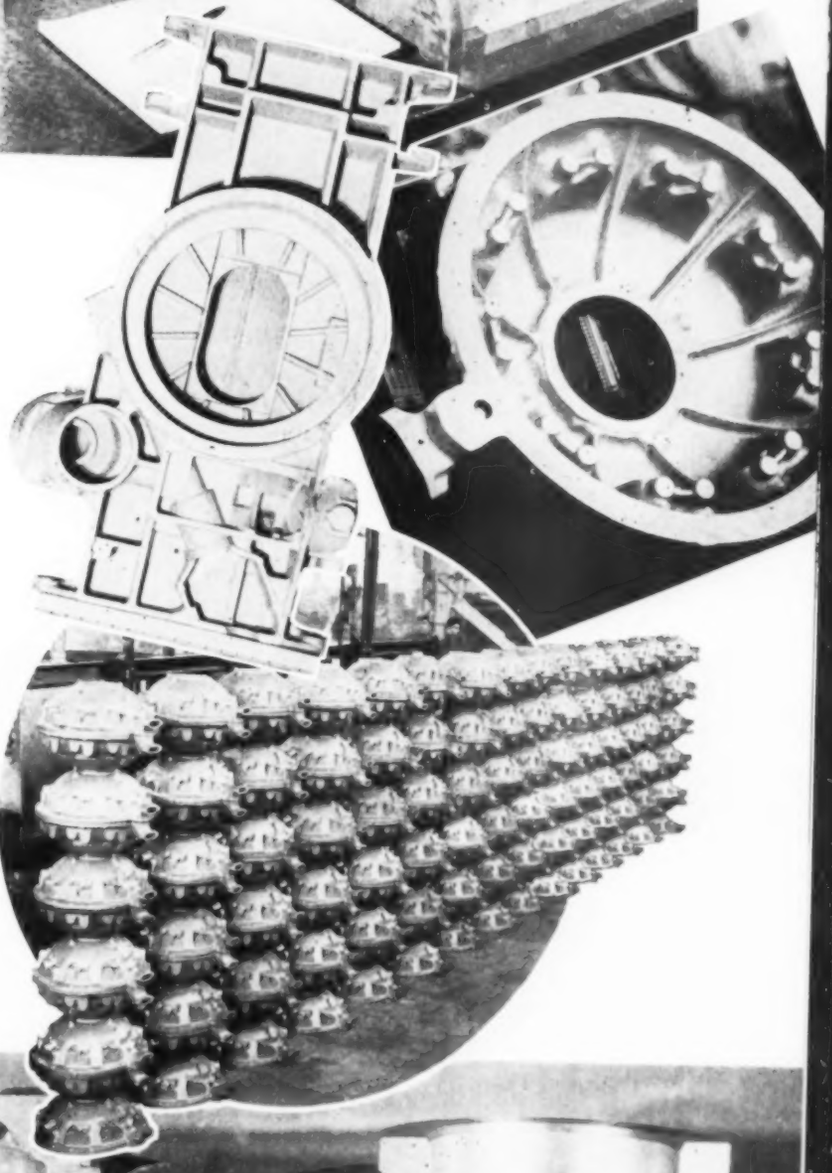


Fig. 1 (Extreme left)—Aluminum sand castings that require specially constructed indicating calipers for checking fins, ribs and wall thicknesses

Fig. 2 (Lower center)—Dense and porous castings as detected by visual inspecting after machining

Fig. 3 (Lower right)—Dense and porous sand castings after machining. X-ray and radiography readily would show this condition in the rough casting

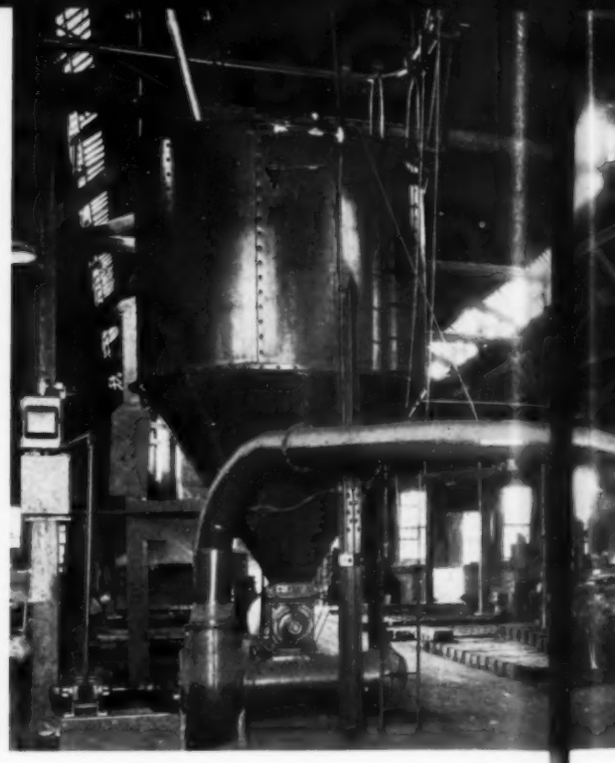
Fig. 4 (Above)—Sample aluminum sand casting in process of layout at the inspection department. The inspector will be able to determine readily if the part has sufficient stock for machining and if the casting conforms to the blueprint specifications

Fig. 5 (Right above)—An 18-inch aluminum casting with numerous bosses, pads, ribs and cored openings which require skill in checking

Fig. 6 (Extreme right above)—Magnesium casting on inspection bench. Note bosses, ribs and various wall thicknesses to be checked

Fig. 7 (Right) Magnesium alloy castings inspected and ready for shipment

INCREASING FOUNDRY PRODUCTION WITH EXISTING EQUIPMENT



By DON J. REESE
International Nickel Co., New York

THE foundry industry continuously develops new technical information about its processes and products. This industry is competitive within itself and it also competes with other industries for materials with which to work and for markets for its products. Men working in any branch, as for example gray iron, not only should seek as much knowledge as possible concerning that division of the foundry industry, but should have a broad interest in all the divisions of the industry. Not only will they have many problems in common with other branches, but they stand to gain from fellow foundrymen's solution of a problem quite similar to their own.

The ferrous field of cast metals usually is divided into cast iron, malleable iron and steel. Years ago these names suggested a fairly definite chemistry, in which cast iron was a material of around 3.50 per cent carbon and 1.0 to 3.0 per cent silicon, malleable iron a material of 2.50 per cent carbon and 1.0 per cent silicon and cast steel a material of 0.3 per cent carbon and 0.2 per cent silicon. These fields are *not* so clearly defined today and there are some materials which are intermediary between cast iron and malleable and between malleable iron and steel. But steel foundrymen talk about a 2.0 per cent carbon cast steel, cast iron foundrymen refer to a 2.0 per cent carbon cast iron, or a malleable foundryman speaks of a 'graphtized' steel. We need be concerned particularly with the overlapping of fields in the ferrous foundry industry, especially when equally experienced experts in the field of metallurgy can prove a material is steel because it contains less than 1.7 per cent carbon, which is the division point between steel and iron on the iron carbon diagram, or prove that the material is malleable iron, even though it contains less than 1.7 per cent carbon, because it is brittle and nonductile 'as cast' and after an annealing treatment is ductile and contains nodular graphite in the matrix structure.

Cast iron has been cupola melted for many generations. Some cast iron, specifically ingot molds, has been poured direct from blast furnace metal. Important quantities and qualities of cast iron have been air furnace melted for more than 80 years. Although cast iron has been made in the open hearth, rotary, electric and crucible furnaces, that furnace and that product which have been most closely associated in the minds of men have been the cupola and cast iron. That type of furnace is important!

Employ Compound Methods

The cupola not only is used as an individual furnace but frequently is combined with 1, 2 or more furnaces in what frequently is referred to as 'duplexing' or 'triplexing' processes. These have found increasing application in the foundry industry. Whenever two or more furnaces are combined into one process it is 'almost' axiomatic that one of these furnaces is a cupola. Whenever a cupola is combined with other furnaces in a process it is quite likely that the key to success may be found in the skill employed in operating the cupola.

First method of producing steel in quantity was the bessemer or Kelly converter process, a duplex process combining blast furnaces and bottom blow converters. A modification of that process in some steel mills utilized a large cupola to melt metal for the converters. Incidentally, these large cupolas went into service with the first shift on Monday morning and went out of service with the last shift on Friday or Saturday night. The cupolas were in service for a full week in contrast to foundry service of 1 to 16 hours. A modification of the bessemer converter was the development of the tropenas or side blown converter, which, when combined with the cupola, produced steel for castings. These processes not only are production methods but are exceedingly high speed production methods. A converter charge is refined from its iron chemistry to

Men working in any one branch, whether it be malleable, steel or gray iron, should have a working knowledge of the melting mediums used in the other branches

its steel chemistry in 10 to 15 minutes.

The electric furnace became well established in this country during the period of World War I and was exploited rapidly during the period between 1920-1930. During that period converter steel castings almost disappeared. The reasons involved both technical and economic considerations. It was a profitable period so industry had money to spend; power companies wanted the increased demands for their commodity; converter steel was high in sulphur, would hot short, crack, etc. Many of the technical reasons were not entirely sound as it was not realized that converter steels were likely to be of extremely high temperature, above 3000 degrees Fahr. and that many foundry problems were introduced largely by the excessive temperature.

Learn Lessons from Experience

Now the need for increased output has revived the cupola-converter method of making steel. We are fortunate that this method of making steel never completely disappeared from American industry and that we not only have this type of equipment available for production but that we still have personnel skilled in that method of production. It would seem that the industry should learn a lesson from this experience. While we strive for better methods and better products, we should not fail to explore the full possibilities of old processes, or throw these processes and their producing equipment in to the discard without full consideration of their merit. Revival of the cupola-converter process dates back some 7 or 8 years. This process sometimes is combined into a cupola-converter-electric furnace layout but in this particular case the electric furnace serves mainly as a reservoir ladle with a heat source, if it's necessary to add heat. If the capacity of the electric furnace in this combination is much greater than the unit addition of new metal or the unit quantity of metal tapped, then it serves to smooth out variations in chemistry control. However, this furnace can have a definite function in the process, if metals or alloys are added there or if the refractories or slags in the electric furnace are directed toward phosphorus or sulphur reductions.

Success of the cupola-converter process lies in the following: (1) Synchronising the melting rate of the cupola with the refining or conversion rate of the converter; (2) In operating the cupola so that its product is of uniform chemistry and high in temperature; (3) Being certain that converter techniques are kept within limits.

(*Please turn to page* 187)

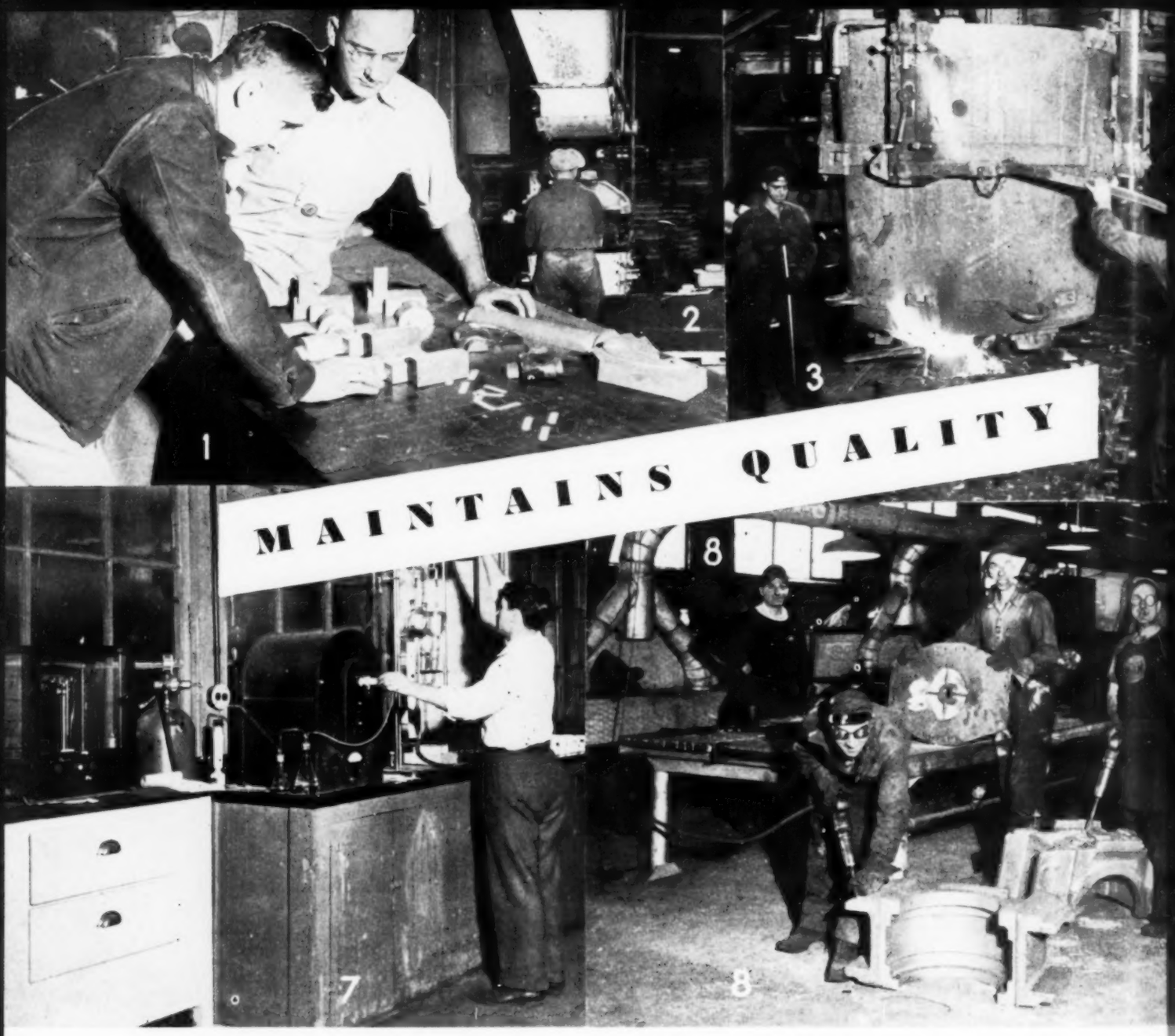


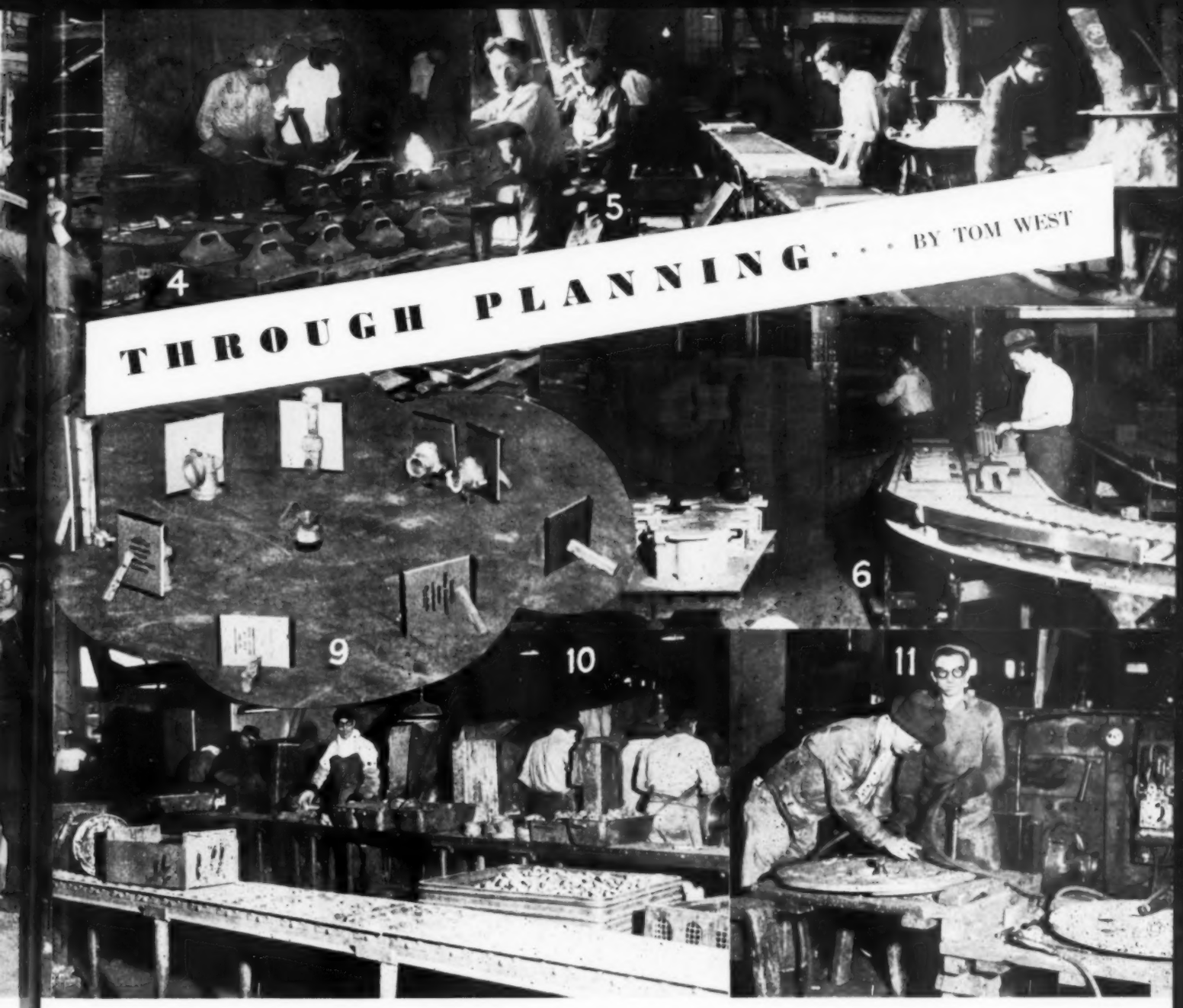
Fig. 1—Space should be available so that new patterns may be checked carefully. Fig. 2—Molds made on squeezer machines are placed on conveyors. Fig. 3—Molds are poured from metal melted in the electric furnace. Fig. 4—Small steel casting department. Fig. 5—Core makers work

THE steel foundry today is being called upon to produce a great tonnage of the best quality castings. To secure good quality castings consistently, it is necessary for the plant to have a place available so that the men in the shop may study new incoming patterns. Among other things, this group locates the heads and gates on the patterns. These meetings should be held daily and it is imperative that sufficient time be given to do the job completely, as a mistake or oversight in this study may cause untold difficulty later.

There are various ways in which the cast samples are tested, both nondestructive and destructive. Some castings are water quenched immediately after pouring and fractured with a sledge hammer, analyses and design permitting. Another quick and efficient way is to cut the casting with an acetylene torch where one suspects trouble. The ground section is then hot etched in acid. Another method, which takes a little longer, is to machine the casting to blueprint and then to over or under cut beyond the limits of the blueprint to make sure the casting does not show any defects. Other tests used quite extensively are the gamma ray, Fig. 9, and the magnaflux test.

In one steel foundry located in the East, all jobs to be sampled have a metal sample tag nailed on the pattern and this tag must not be removed unless the sample has been approved by the proper authorities.

In this plant the pattern and coreboxes for the larger work are laid on the planning room floor and the group previously mentioned discusses the heading and gating problems. A pattern maker then proceeds to make the head, gates and chills as instructed by the group. For the smaller work, a full size paper template is cut out and laid on a table. This template contains lines representing the different flask sizes as shown in Fig. 1. The necessary equipment can then be ordered after the flask size is agreed upon, along with the number of pieces and position of the pattern on the board or plate.



THROUGH PLANNING . . .

BY TOM WEST

along a mechanically driven rubber belt. Fig. 6—The core room has two vertical core ovens. Fig. 7—Chemical laboratory. Fig. 8—Chipping room. Fig. 9—The gamma ray test is used extensively. Fig. 10—Small castings are cleaned by a variety of equipment. Fig. 11—Cleaning castings

Fig. 4 shows a small steel casting department. Continuous pouring of molds would be ideal, but with the electric arc furnace, the entire heat is tapped at one time. After pouring, the molds are shaken out on a shaker and the sand then goes back into the system through a series of belts and screens to a large storage tank directly over a muller. Some bentonite and water are added to the sand while it is being mulled to provide the properties required for backing sand. The entire shop uses a strictly new sand facing, which is made with cereal binder and bentonite.

Squeezer machines are operated 24 hours a day to produce molds which the molder places on racks adjacent to the machine, as shown in Fig. 2. Two molders work to fill a rack or carrier. When the carrier is filled with molds, a laborer pushes it forward and places another empty carrier in position to be filled again with molds. An overhead crane picks up enough carriers for a heat and deposits them on two lengths of conveyors. Conveyors are 90 degrees from the racks so that the carriers can ride on the conveyors. In this position the molds are ready for pouring.

Molds on the small floor are either hand shanked or poured over the lip of a large ladle. To simplify matters, all molds which are to be double reversed are left on the floor because it is unhandy to pour them on the racks. It is also essential to mold patterns with the like specifications in the same period of time. For example, casting of one specification may be poured one week and those of another specification the following week. In this way there is little danger of pouring the wrong metal into the molds. Castings from each heat together with the test bars are sent to the cleaning shop as a unit where the heat number is stamped on each individual casting before any work is done on them. Thus identity is established as to heat number so they can be located at any required time.

The large steel floor of (*Please turn to page* 186)

PROTECTING LIFE, PROPERTY
in the Foundry Industry
During the War

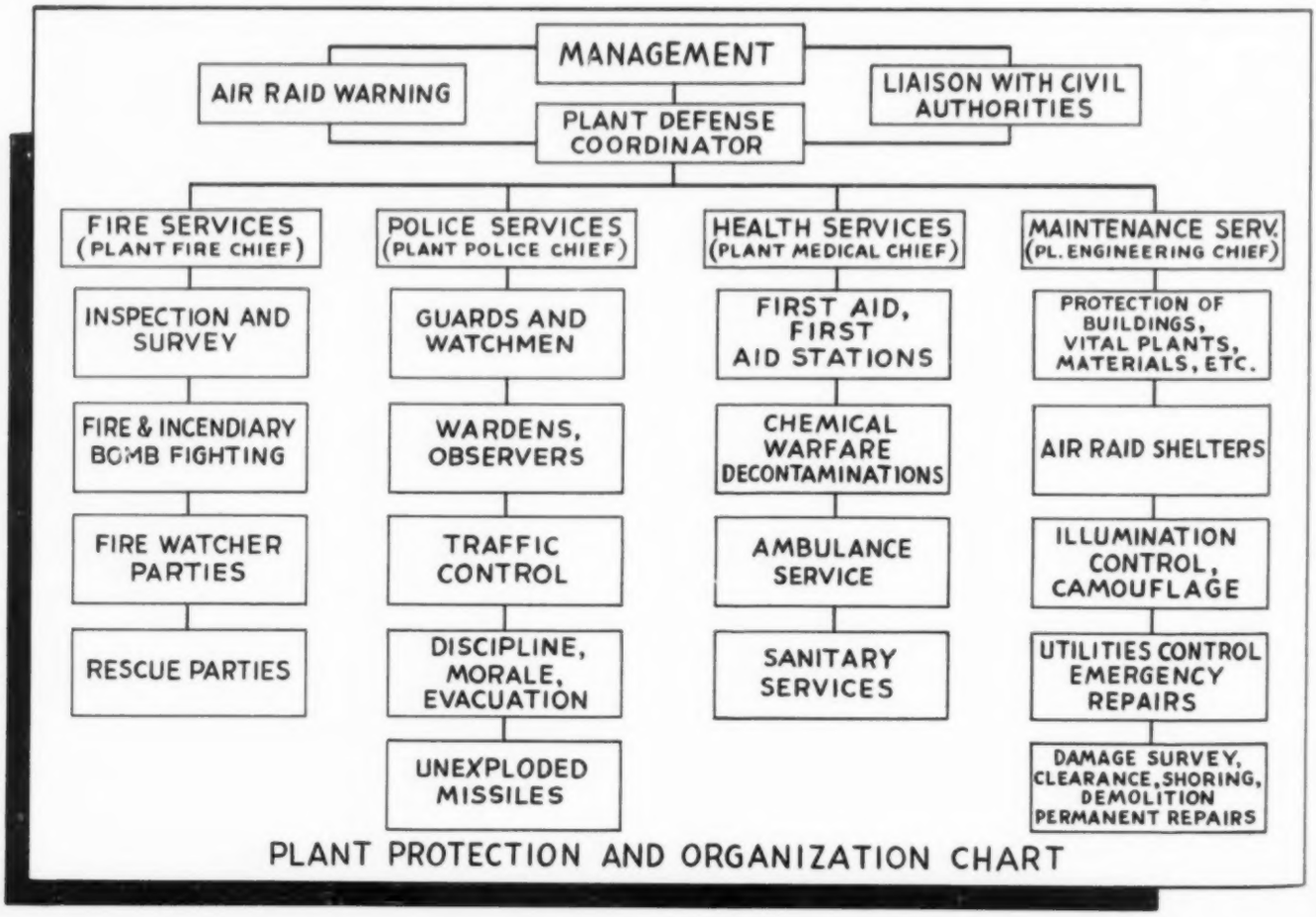
FOREWORD

At the suggestion of the Office of Civilian Defense, Washington, the foundry industry has considered means of protecting the industry against sabotage and the effects of aerial bomb raids, and of preparing so that damage from air raids may be controlled and limited.

The foundry industry is absolutely essential in this national emergency and it is up to the men in the industry to see that every precaution is taken in the interest of the national welfare.

This code of recommended practices, rules and admonitions, has been developed by a committee of the American Foundrymen's Association to be used as a guide in protecting the lives and property in the industry and to help prevent serious curtailment of production through subversive activities or actual bombings.

The committee which prepared this code, known as the American Foundrymen's Industrial Hygiene Codes Committee, is as follows: Chairman, James R. Allan, International Harvester Co., Chicago; S. B. Hansen, International Harvester Co., Chicago; E. O. Jones, Belle City Malleable Iron Co., Racine, Wis.; C. P. Guion, W. W. Sly Mfg. Co., Chicago; C. F. Larsson, American Air Filter Co., Chicago; S. McMullan, Western Electric Co., Cicero, Ill.; Nathan Lesser, Deere & Co., Moline, Ill.; R. W. McCandlish, Research Corp., Chicago; B. A. Parks, Crane Co., Chicago; John F. Tobin, American Blower Corp., Chicago; Secretary, Miss P. R. Mockler, American Foundrymen's Association, Chicago; *Conferees:* W. J. Barclay, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.; M. E. Johnson, Whiting Corp., Harvey, Ill.; Paul King, coordinator, Lake County Council of Defense, Waukegan, Ill.; H. Madsen, Whiting Corp., Harvey, Ill.; W. J. Riddle, Carnegie-Illinois Steel Corp., Gary, Ind.; C. J. Warneke, American Scientific Co., Chicago.



PLANT PROTECTION AND ORGANIZATION CHART

T AND PRODUCTION

Code of Recommended Practices
Developed by the
Industrial Hygiene Codes Committee
of the
American Foundrymen's Association

Reviewed and Passed by the
Office of Civilian Defense

Introduction

These recommended practice rules and admonitions for the protection and defense of the foundry industry have been prepared by a committee for the foundry industry.

Three elements have been kept in mind in preparing this manual; they are as follows:

(a) Effectiveness of the recommendation.

(b) Minimum cost to accomplish the desired results.

(c) Minimum time required to prepare for the protection and defense of the property.

Because the foundry industry is comprised of units of every conceivable type, variety of casting and producing facilities, and because the sizes of individual businesses vary from only a very few employes to concerns employing many thousands, the problem of offering suggestions and recommendations, naturally, is almost beyond comprehension.

In addition to foundries being operated as separate entities, a large number, including some of the largest foundry units, are captive foundries being operated by and as a part of manufacturing establishments. When a foundry is a part of a manufacturing plant, the whole plant should be considered in the protection and defense recommendations.

It is felt, however, that the recommendations and admonitions contained in this text can be applied successfully in a great many instances; and in other cases a compromise can be made between several suggestions to accomplish the desired results but in any event the plans developed herein may be adapted to the particular plant.

The whole problem of the protection and defense of industry naturally ties in very closely with the precepts of the United States Office of Civilian Defense and the various state and local defense agencies and councils. Industry problems are quite different from civilian and neighborhood problems, but there is one common objective and that is the protection of persons from injury, safeguarding property, and keeping up the morale. In one important phase the industry problem is different from others and that is the tremendously vital one of keeping essential industry operating with no stoppage of production of war materials, equipment and supplies.

It is incumbent upon the foundry industry to provide safeguards that will afford the protection required in the interest of the national welfare.

Section 1—Scope

These recommended practices and admonitions are intended to apply to all foundries operated as civilian enterprises, whether doing work directly or indirectly in connection with the war effort or for strictly civilian requirements, except that these recommended practices and admonitions shall not apply to foundries owned, operated or directed by any agency of the federal government; nor shall they apply where the Federal Bureau of Investigation or other accredited agency of the Federal Government has issued specific instructions for the safeguarding of operations, unless the application of these recommendations will further strengthen the protection required.

Section II—Purpose

Purpose of these recommended practices and admonitions is to provide a list of suggestions to be carried out in order to limit and restrict damage to foundries during enemy attacks from the air; also preparing the operations for a blackout and to prevent acts of sabotage because any one of these hazards may endanger the lives of occupants of such places, cause property damage, or stoppage of essential operations. Proper cognizance of the dangers involved and advance preparations to cope with them will improve greatly the morale of the employes. Experience has proven that the properly drilled and trained personnel of organization can limit the damage caused by the enemy.

Section III—Definitions

Foundry. A foundry shall mean building or group of buildings used for the production and processing of ferrous and nonferrous castings.

Foundry Industry. Foundry industry shall mean all foundries, plants, establishments and other work places in continental United States used for production and processing of ferrous and nonferrous castings. In the case of captive foundries it should include plants or establishments of which the foundries are physically a part.

Captive Foundry. Captive foundry shall mean a foundry that is part of a manufacturing establishment where foundry operations are only incidental to the regular operation of the plant.

Shall. The word "shall" means mandatory.

Should. The word "should" means advisory.

Strategic. The word "strategic" means important, essential, vital.

(*Please turn to page* 182)

Chemical Reaction Generates Heat in Briquet Additions

At some time or other we recall reading about a process called the silico-thermal process of melting metals. In that sodium nitrate and ferrosilicon were combined with the metal to be melted, and the chemical reaction resulting generated sufficient heat for melting. Can you tell us where we can obtain information on it?

We believe that the silico-thermal process you refer to pertains to a type of briquet which is made in Canada and used in a number of foundries in this country. We understand that the briquets contain a certain amount of ferrosilicon and sodium nitrate which provides the thermal action, and an excess of ferrosilicon to provide for the silicon addition to the metal to which the briquet is added. Chromium additions are made in in a similar manner.

Wants To Produce Cylinder and Piston for Hydraulic Press

We have an order for a semisteel 800-pound cylinder and a 150-pound piston for a hydraulic press. We are not familiar with semisteel melting practice and will appreciate your advice on the proper mixture and cupola practice required.

Without a knowledge of the metal thickness and the available pig iron and scrap, we cannot specify a definite mixture. Assuming that the walls of the cylinder are 3 inches thick, iron of the following analysis will serve: Silicon 1.00 per cent, manganese 1.00 per cent, sulphur 0.08 per cent, phosphorus 0.25 per cent, total carbon 3.00 per cent. For thinner walls the silicon and total carbon are increased and the manganese decreased. The amount will depend on the thickness of section. The metal must be hard, dense and tough, but also must be machinable.

Proper gates and risers must be applied to secure a clean, homogeneous casting free from shrinkage, porosity and segregation. If possible the casting should be poured on end in a dry sand mold. The core should be dried perfectly and well vented to prevent the metal from kicking. A typical 1000-pound charge will contain 250 pounds steel rails in short lengths, 500 pounds pig iron and the remainder a good grade of machinery scrap. If necessary the anticipated analysis may be insured by the addition of the required amount of ferrosilicon and ferromanganese.

If you are accustomed to melt hot iron, 2800 degrees Fahr., you should have no trouble with this mixture. If your ordinary iron is melted at a lower temperature, you will have to raise the bed and use larger splits of coke between the charges. Place the steel on the coke, followed by the pig and scrap. Use limestone on the bed coke and between the charges, about 40 pounds per 1000 pounds of metal. Take a wedge test of the metal from the ladle. You readily can estimate from the fracture if the metal is suitable. If too hard, add a little ferrosilicon. If too soft, add a little ferrochromium.

Emergency Shafting May Be Made From Cast Steel

We operate a foundry in Cost Rica and would like to make steel shafting for driving sugar rolls. The shafts range from 5 to 10 inches in diameter and must withstand severe operating conditions. We have a cupola, and a small tropenas converter. Can you tell us if it is practical to cast the shafts, the most suitable compositions, and methods of molding?

Steel shafting for driving sugar mill rolls should be made of rolled or forged steel rather than cast. Manufacture by casting only can be recommended as an emergency measure. The molds should be made of a good dry sand mixture, of sand suitable for steel castings, and should be made and poured "on the flat"; that is with the shaft in the horizontal position. Heads should be of a diameter approximately equal to that of the shaft, and located at intervals of about a foot apart. The casting should be gated at one end.

An alternate method of pouring would be to place one of the heads at the end of the casting, gate into it, and pour the casting with the head and gate at a lower level than the rest of the piece. Then when the mold is poured, tip the mold up so that the end head and gate are at a higher level than the rest of the casting. This can be done by placing a support near the center of gravity of the mold, shifting the mold on the support by lifting on one end, and propping it up after pouring.

We would recommend a steel containing 0.20 to 0.30 per cent carbon, 0.60 to 0.80 per cent manganese, 0.30 to 0.50 per cent silicon, and sulphur and phosphorus preferably under 0.04 per cent. After pouring the castings should be heated 2 to 4 hours at 1650 de-

grees Fahr., air cooled and again heated to about 1200 degrees for 4 to 6 hours, and cooled in air. A preliminary annealing to remove casting strains before cutting the heads off with a gas torch would be helpful, but not essential.

Bronze Bushing Defects Result From Absorption of Gases

We are submitting a sample bronze bushing 5⅝ inches outside diameter, 4⅜ inches inside diameter and 12 inches long. It is made from the 88 per cent copper, 10 per cent tin, 2 per cent zinc alloy. Pouring temperature is 2100 degrees Fahr. We wonder if it has been poured at too high a temperature or if the metal is at fault. Defect shows up after machining. Bushing is made standing up. We made about 150 and 3 or 4 were bad.

Three or four castings out of 150 is only 2 per cent, and would be considered excellent practice in most foundries. However, we believe that the defects exhibited in the sample are such that other castings poured from the same heat must have been below standard, although not sufficiently so to be rejected. Possibly the defects did not show because sufficient metal was not removed. The sample submitted looked as though it had been exposed to furnace gases for an excessive period which resulted in pinholes and bubbles when the metal solidified.

Pouring temperature does not seem to be excessive although 25 to 50 degrees cooler might give a better looking fracture. However, that is not the real trouble. Are you attempting to melt borings and turnings and pour them into castings? That is a source of trouble due to the large surface exposed to the furnace gases. It is better by far to melt that material, pour it into ingots and then use those in the heats. Possibly you could reduce your pouring temperature by changing the gating method.

Presumably you gate so that the metal enters the bottom of the mold and rises the full length of the bushing to risers at the top. Perhaps you only have one gate where two might serve better. By connecting the pouring sprue to the bushings through two or more gates, the mold can be filled in a short time. Consequently the metal may be poured at a lower temperature. We also suggest that you investigate the condition of the sand in cores and molds. However, you have so few defective castings that sand as a source of trouble hardly seems possible.

High Zinc Brass Flanges Have Bad Surface Appearance

We have in hand a large order for brazing metal flanges and are experiencing a great deal of difficulty from smoky, curly, dirty, flaky looking surfaces. The alloy contains 14 to 16 per cent zinc, 0.75 to 1.00 per cent lead, and remainder copper. We have tried fluxing with various materials without success. Best results are obtained with 1½ ounces of No. 21 aluminum scrap per 100 pounds of metal, but even that leaves much to be desired. We pour into a large size pouring basin, and keep it full.

The curly, drossy appearance of the 15 per cent zinc alloy is typical of such compositions. Fluxing is not the remedy, if by that you mean use of proprietary compounds. Use of a fraction of 1 per cent aluminum is the best corrective procedure, and the usual amount is 0.10 per cent maximum or 1.6 ounces per 100 pounds. You mention that you have tried No. 12 aluminum scrap which contains about 8 per cent copper with a little success. One trouble with that is to make sure it is No. 12 and nothing else. Another point to remember is not to keep adding the same amount of aluminum when return scrap is involved since, as the aluminum content increases difficulty will be found in brazing. In other words hold the content to 0.1 per cent.

Aluminum forms an envelope of aluminum oxide over the surface of the brass, and prevents the drossy appearance—provided of course, that the envelope or skin is not broken during pouring. From your description it appears to us that you may be pouring too cold, and that you are not pushing the metal into the mold fast enough. Possibly the pouring basin is not high enough above the mold to give the necessary force in pouring. Also it may be advisable to use several small sprues rather than one large one. Gating is important with any type of alloy and particularly so with yellow brass since the metal must fill the mold as quickly as possible. You will find it worthwhile to pour the metal uphill. Skim the metal thoroughly before pouring and pour strongly if you want to obtain the best results.

GANGWAY! By J. A. Patterson

"Sure it smells good! Stick around and I'll give you a piece of the pie I'm bakin' in there"

White Iron Casting Gives Trouble

We manufacture white iron grinding balls, and for the past week or so a large percentage of the castings have a thin skin which peels off when rumbled. The larger the castings, the greater the percentage of the defect. We melt in a 30-inch cupola using 350 pounds of steel scrap, 100 pounds white iron scrap, 50 pounds gray iron scrap, 60 pounds foundry pig iron, and one silicon-manganese briquet. Analysis of the iron shows 3.00 per cent carbon, 0.15 per cent phosphorus, 0.130 per cent sulphur, 0.50 per cent silicon, 0.50 per cent manganese, and 0.40 per cent chromium. Strength of our molding sand is maintained by addition of new sand, and the sand is handled in a continuous system. It reaches the molders at normal temperature. Tests on heap sand show an average permeability of 65, green compression 2.9 pounds per square inch, and moisture 6.6 per cent. Iron is melted hot, and have no trouble in running the castings even with small gates on the small size balls.

It must be taken for granted that the thin skin which peels off when rumbled is derived from the sand. The only iron condition which would resemble that is a very thin reverse chill, but we never have seen one which would rumble off from white iron in the unannealed state. The only thing about a white iron which reasonably might be expected to have an influence on the refractoriness of the sand would be presence of oxygen in abnormal quantity in solution or perhaps contained in the entrapped slag. Of course, any oxygen would flux readily with the silica portion of the sand, and cause the condition about which you complain.

As a general rule reference to composition of the iron is of little value unless it has been checked with relation to the material containing the defect since there is no assurance that the two are similar. General description of your cupola operation sounds as though you might be producing over-oxidized or dirty iron. Of course, at 3 per cent carbon, no oxygen would remain permanently in solution. At the rate with which the iron flows through the cupola, there might not have been time for the carbon and oxygen to react in any significant amount. If you are having any tendency toward blowholes that would be an indication of oxidized iron.

We note that in the analysis you show 0.40 per cent chromium, but do not mention where it comes from unless part of the steel is the chrome type. Information is lacking on your sand mixing procedure, and it is possible that your heaps are not all that they should be. It might be a good plan to make a petrographic examination of the material which rumbles off the castings to see if it can be identified as to origin. Cooling the hot metal with culls or scrap is exceedingly poor practice. Usually it introduces extraneous material which forms slag, and unless the slag is removed it will enter the mold and show up on the surface of the casting.

Expansion Data Are Not Available

We have an inquiry for brass parts to operate under thermal conditions. Our customer desires us to supply an alloy with the least coefficient of expansion. As these castings have to be machined, the alloy should have a fair machinability.

We are not clear as to what you mean by thermal conditions because there are such a variety of conditions represented by the term. There is comparatively little information available relative to the coefficient of expansion of different alloys regularly produced in nonferrous foundries. One of the compositions which is recognized as having relatively low coefficient of expansion is that known as steam or valve bronze specified by the government for many uses and covered by A.S.T.M. specification B61-41.

That composition contains 86.5 per cent minimum copper, 5.5 to 6.5 per cent tin, 1 to 2 per cent lead, and 2 to 5 per cent zinc. It is comparatively soft and easily machined but like all the nonferrous compositions it has a definite coefficient of expansion. To give you a definite reply on a suitable composition we will have to obtain more information on all conditions to which the casting is subjected.

Small Casting Too Low in Silicon

The skin on our small castings to a depth of about 1/16-inch is hard and white while the remainder of the casting is gray. We shall appreciate your opinion on the cause and remedy.

Cause of the white skin is iron so low in silicon that the surface chills when it comes into contact with the sand of the mold. Charge probably is made up from low grade scrap and shop scrap that has been remelted several times. The remedy is to raise the silicon content in the cupola charge by the addition of ferrosilicon, silvery pig iron or by the addition of pig iron in which the silicon content is reasonably high. From the appearance of the fracture in the samples submitted, the silicon content is not over 1.00 per cent. For the section shown it should be at least 2.00 per cent.

Need Skill To Make Manganese Steel

We wish to know what the present practice is for the production of manganese steel, and what method of quenching is used. Is the converter being used to reduce the steel, or the electric furnace?

Manganese steel containing from 11 to 13 per cent manganese usually is produced today in the electric furnace. A basic lining is essential if the heads, gates and scrap castings are to be remelted, as they should be for economical operation. In a basic lined furnace, the manganese steel remelt, carbon steel, scrap and the necessary amount of ferromanganese all can be melted and brought to the proper temperature with but a slight loss of manganese.

If only an acid lined furnace is used, a heat of low carbon steel is made up and brought to temperature. The required ferromanganese is melted in a separate unit and the two are combined by pouring the low carbon steel from the electric furnace into the melted ferromanganese contained in a ladle. The scrap from the previous heats cannot be melted in the charge. Some makers of manganese steel still use the side blow converter, and a small amount is made from openhearth steel. As in the case of the acid electric furnace, the manganese steel scrap from previous melts cannot be incorporated as part of the charge.

In operating by those methods, low carbon steel from the converter or open hearth ladle is poured on top of the necessary amount of ferromanganese in another ladle. If the open hearth steel from one ladle is to be transferred to a second, smaller ladle, a rather large nozzle should be used to prevent undue loss of temperature of the steel and possible frozen nozzle in the second ladle.

Method of quenching 11 to 13 per cent manganese steel is to bring the castings to a temperature slightly above 1900 degrees Fahr., and quench them in a large tank of water, without allowing the temperature of the castings to fall too far below 1900 degrees before they actually go into the water. No further heating is permissible after the quench. There are many features of manganese steel production which require experience not usually possessed by foundrymen familiar with the manufacture of carbon and the usual alloy steels, if serious trouble and loss of castings is to be avoided. A foundry whose staff has no experience with manganese steel production should not attempt to enter the field without the guidance and assistance of a competent man familiar with all the problems involved.

Conversion TO WAR PRODUCTION CALLS FOR MORE INFORMATION ABOUT ALLOYS...

Conversion to war production makes great demands upon both plants and personnel. While altering plant layouts, experienced employees must be taught correct methods of handling new operations on different metals. New employees must be trained...and taught to avoid waste and spoilage of critical materials.

You can *quickly* obtain practical answers to questions about the selection, fabrication and uses of ferrous and non-ferrous alloys containing Nickel by asking us. We have on hand a fund of information collected through years of research, field studies and experiences of alloy users.

This data has been checked and edited into convenient charts and pamphlets. These printed pieces range from technical data for engineers to simplified guides for apprentices.

Now...with minutes and materials so vital to Victory...make full use of this metal-working experience. Our technical staff also offers personal assistance in overcoming problems created when Nickel was allotted to places where it serves the Nation best.

★ ★ *Nickel* ★ ★

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK, N. Y.

men of industry

DUNCAN P. FORBES, elected president of the American Foundrymen's Association at the Cleveland convention, is president and general manager, Gunite Foundries Corp., Rockford, Ill. A native of Rockford, Mr. Forbes comes from a long line of foundrymen. His great grandfather, Duncan Forbes, was one of the pioneers in the production of malleable iron in America and established the present company in 1845. Mr. Forbes graduated from Yale University in 1929. In a post graduate course the following year he specialized in metallurgy. Later he spent some time in the laboratory of Enrique Touceda, studying malleable iron metallurgy. In 1921 he spent a year as a molder in the plant of the Rockford Malleable Iron Works and then became junior metallurgist, later molding foreman and in 1925 was appointed works manager. As a result of extensive research work under his direction a method was developed for producing high test gray iron from the air furnace. When the Gunite Corp., was formed in 1928 to promote the manufacture and sale of that metal, Mr. Forbes was elected president. Later he was elected to the presidency of the Rockford Northwestern Malleable Corp., which became the Gunite Foundries Corp., in 1932. Mr. Forbes was vice president in 1941, served from 1938 to 1940 as director, and was a member of the board executive committee for one year. At present he is chairman of the Malleable Iron Division of the A.F.A., having been a member since the organization of the division in 1932. He also is chairman of the malleable division advisory committee, the technical activities correlation committee, castings promotion committee, and the gray iron subcommittee on specific applications. He has served on several other A.F.A. committees, has presented papers and talks before national and chapter meetings, and was active in the organization of the Northern Illinois-Southern Wisconsin Chapter. (*See page* 90).

♦ ♦ ♦

L. C. WILSON, general manager, Reading Steel Casting Division, American Chain & Cable Co. Inc., Reading, Pa., has been elected vice president of the American Foundrymen's Association. Mr. Wilson attended the schools of New Haven, Conn., and received his technical training in the Sheffield Scientific School of Yale University, graduating from that school in 1907 with a degree in mechanical engineering. Upon completing his work at Yale, Mr. Wilson entered the sales department, Harbison-Walker Refractories Co., representing that company over a period of years in the Pittsburgh, Chicago, New York and New England districts. Later he joined the staff of the Chain Belt Co., Milwaukee, as assistant to the vice president, and then was appointed general sales manager. Following this he became connected with the Federal Malleable Co., Milwaukee as secretary. Mr. Wilson later was elected vice president and general manager, which position he resigned to accept his present position with the Reading Steel Casting Division. He has served as a director of the A.F.A. for 3 years, 1926-1928, and for many years has been a member of the steel division advisory committee, chairman of the committee on impact testing, chairman of convention sessions and in many other activities of the association. He represents the A.F.A. on committee E-1, methods of testing, of the A.S.T.M., and is chairman of the A.F.A. steel division committee on impact testing. (*See page* 90).

R. G. McElwee

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R. G. MCELWEE, since 1940 in charge of the foundry department, Vanadium Corp. of America, Detroit, has been made principal industrial specialist and metallurgical consultant in the War Production Board, Washington, and has been assigned to the forgings and castings unit of the iron and steel branch. Mr. McElwee was born in Williamsport, Pa., in 1915 entered the employ of the Muncie Foundry & Machine Co., Muncie, Ind., as chief inspector. A year later he became connected with General Motors Truck Co., Pontiac, Mich. as buyer and in 1926 was made engineer of the American Car & Foundry Co., Detroit. From 1928 to 1932 Mr. McElwee was employed as foundry engineer with Whitehead & Kales Co., River Rouge, Mich., and in the latter year became connected with the Ecorse Foundry Co., Ecorse, Mich. In 1936 he joined the Vanadium Corp. as consultant on the use of the extensive range of alloys manufactured by that organization.

♦ ♦ ♦

A. C. CARLTON, curator of fuels and metals, Museum of Science and Industry, Chicago, has been granted temporary leave of absence to assist the War Department in the production of ammunition.

♦ ♦ ♦

DR. FRANK J. TONE has retired as president of Carborundum Co., Niagara Falls, N. Y., with which he has been associated since 1895. Dr Tone was appointed chairman, a new position, and ARTHUR A. BATTS, secretary, has become president.

♦ ♦ ♦

D. H. PACE, vice president and general manager, John Deere Plow Co., Kansas City, Mo., and director, Deere & Co., Moline, Ill., has been appointed consultant to the Farm Machinery Branch, WPB.

♦ ♦ ♦

C. H. CLINE recently has joined the Continental Roll & Steel Foundry Co., East Chicago, Ind., as a supervisor. He received his education in the Ravenswood and Parkersburg, W. Va., public schools. In 1923 he joined the Blackwood Electric Steel Co., Parkersburg, as a foundry clerk. From 1925 to 1940 he held various positions with the

(*Continued on page* 118)

Woodward

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America's Largest Completely Integrated and Entirely Independent Merchant Iron Producer

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(*Continued from page* 116)

Duralloy Co., Scottdale, Pa., including plant superintendent. For the past 2 years Mr. Cline has been with the Fort Pitt Steel Casting Co., McKeesport, Pa., as manager of the stainless and corrosion division, and LeTourneau Co., Toccoa, Ga., as foundry metallurgist.

♦ ♦ ♦

W. H. SPENCER, formerly works manager, Thomas Foundries, Inc., Birmingham, Ala. has resigned to become a senior industrial specialist, War Production Board. Mr. Spencer is attached to Tungsten Branch of Materials Division, WPB and is administrating General Preference Order M-110 which provides for the conservation and allocation of molybdenum.

♦ ♦ ♦

CLARENCE TOLAN JR., recently elected a member of the board of directors, Link-Belt Co., Chicago, is president of Dodge Steel Co., Tacony, Philadelphia. Mr. Tolan, after spending 2 years at the University of Pennsylvania, started his business career in a bank, followed by selling pig iron and coke. From 1908 to 1922, he sold steel castings for the American Steel Foundries and other companies, with the exception of 3 years, 1916 to 1919 which were spent in the armed services. Mr. Tolan's connection with Dodge Steel Co. extends from 1922, first in the capacity of vice president, and later as president. He has served as a member of the board of directors of the executive committee of the Steel Founders' Society of America and as chairman of the advertising committee of that association from 1938 to 1942.

♦ ♦ ♦

J. EUGENE JACKSON, formerly metallurgical engineer with the Copper Iron & Steel Development Association, Cleveland, has accepted a position as senior industrial analyst, War Production Board, in the Salvage Unit, Disposition of Material Section, Inventory and Requisitioning Branch, Division of Industry Operations.

♦ ♦ ♦

J. L. LONERGAN has been appointed superintendent of the Easton, Pa., plant of Taylor-Wharton Iron & Steel Co., High Bridge, N. J. Mr.

J. L. Lonergan

Lonergan became affiliated with the company in November, 1941. He was associated with the Morris Machine Works, Baldwinsville, N. Y., from 1902 to 1940, becoming vice president and general manager. From 1940 until he joined Taylor-Wharton, he was foundry superintendent, Pomona Pump Co., Pomona, Calif. He was the former president of the New York State Foundrymen's Association, Syracuse Foundrymen's Association, Central New York Purchasing Agents and Taylor Society. He is a director of the A.F.A.

♦ ♦ ♦

B. W. CLARK, formerly vice president in charge of the merchandising division, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been appointed vice president in charge of sales. He succeeds Ralph Kelly, who resigned to become executive vice president, Baldwin Locomotive Works.

♦ ♦ ♦

C. E. FRUDDEN, executive engineer, Allis-Chalmers Co., Milwaukee, has been appointed consultant to the Farm Machinery Branch, WPB.

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WILLIAM M. PARRISH, industrial sales executive, International Harvester Co., Chicago, has been appointed assistant chief, Construction Machinery Branch, WPB.

♦ ♦ ♦

J. T. BARAL JR., has been appointed advertising supervisor for the foundry divisions, Baldwin Locomotive Works, Philadelphia. Mr. Baral formerly was advertising manager, Roberts & Mander Stove Co., Philadelphia, and the R. M. Hollingshead Corp., Camden, N. J.

♦ ♦ ♦

JOHN L. CARTER, foundry cost consultant, Newark, N. J., has been appointed head consultant, Castings Unit of the Iron and Steel Section, Office of Price Administration, Washington. Mr. Carter's particular field will be the gray iron foundry industry. Before going to O.P.A., Mr. Carter, in addition to this foundry cost consulting business, was secretary of the New Jersey Foundrymen's Association, the North Jersey Nonferrous Founders' Association, and the Metropolitan Brass Founders' Association. His familiarity with the gray iron foundry industry and its problems stems from a long and varied experience in foundry management, trade association activities, and cost consulting work. During the 15 years when he was manager of Barlow Foundry Inc. and later Sacks Barlow Foundries Inc. of Newark, N. J., he served as chairman of the cost committee, Gray Iron Institute, which devised the first standard cost system for gray iron foundries. During N.R.A. days, as cost adviser and Eastern agent of the Gray Iron Foundry National

(*Concluded on page* 120)

W. H. Spencer

Clarence Tolan Jr.

John L. Carter

J. Eugene Jackson

Foundrymen have reduced core-baking time and increased core-oven output as much as 50% with Truline Binder.

And that is only one of the benefits of Truline Binder in steel, grey iron, malleable, and non-ferrous foundries. Others are:

Cores burn out fast, reducing the danger of hot tears, and speeding cleaning sometimes as much as 30% to 50%.

Castings are smooth. They need less cleaning, and fewer are rejected by inspectors.

Truline Binder permits the use of as much as 75% black sand in many cores now using new sand and slower-baking binders.

Finally, Truline Binder is low in cost. Thus it offers you the opportunity to turn out more sound castings, with less labor, without expanding oven equipment or cleaning labor—and saves you money besides.

Clip the coupon to your letterhead and mail it today. We'll see that you get full information, and a sample if you want it.

NAVAL STORES DEPARTMENT

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Please send ☐ sample ☐ information on how to use Truline Binder in casting: .....
(state type of work and kind of metal cast)

.....

Name _____

Company _____ *Title* _____

Address _____ *City* _____ *State* _____

JJ-84

(*Concluded from page* 118)

Code Authority, he was the author of the standard cost system issued by the code authority. He also traveled throughout all the Eastern foundry districts to promote the organization of local code authorities. Mr. Carter's office is located at room 2520 of the O.P.A. office in Temporary Building S., Washington.

♦ ♦ ♦

WILLIAM C. CARTER, recently elected a director of Link-Belt Co., Chicago, is executive vice president of the company with headquarters in Chicago. Mr. Carter, a mechanical engineering graduate of the University of Illinois, joined the Link-Belt organization in 1902 as draftsman at the Pershing road, Chicago plant. He consecutively has held the positions of engineering department supervisor, construction superintendent, plant general manager, and for a number of years, has been in charge of all company production.

♦ ♦ ♦

ROBERT CLADE, recently appointed works manager, American Car & Foundry Co., Detroit, entered the employ of that company 23 years ago as mechanical engineer, and for several years was in charge of plant layout. During that time several major improvements were made at the various car manufacturing plants and foundries. When the company began the manufacture of lubricating valves, Mr. Clade was placed in charge of that department.

O. A. KELKE recently appointed superintendent of foundries, American Car & Foundry Co., Detroit, joined the company as a time clerk 32 years ago. He was assistant to the superintendent for several years and served as supply agent for 10 years.

♦ ♦ ♦

WILLIAM E. JONES, night foundry superintendent, Pontiac Motor Division of General Motors Corp., Pontiac, Mich., recently was made service engineer, National Engineering Co., Chicago. Mr. Jones served his foundry apprenticeship at Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., and then remained with that organization from 1919 to 1933. When he left C. W. C. he was assistant superintendent of the core department. He joined the Pontiac Motor Division in 1936, and remained with that organization until February 1942 when he joined the National Engineering Co.

♦ ♦ ♦

D. FRANK O'CONNOR, formerly with the Walworth Co., South Boston, Mass., now is connected with the Watts Regulator Co., Lawrence, Mass.

* * *

J. A. FOX, general works manager, Oliver Farm Equipment Co., Chicago, has been appointed a vice president.

* * *

RALPH R. NEWQUIST has been named assistant to Walter Geist, vice president, Allis-Chalmers Mfg. Co., Milwaukee. C. W. SCHWEERS succeeds Mr. Newquist as manager of the Houston office.

♦ ♦ ♦

WILLIAM B. GIVEN JR., president, American Brake Shoe & Foundry Co., New York, was recently named chairman of the board of trustees of that organization. Mr. Given was a captain in the old "Fighting 69th" Regiment.

♦ ♦ ♦

GEORGE J. MORTON, formerly associated with Northern Pump Co., Minneapolis, as production engineer, has been appointed plant manager, Bass Foundry & Machine Division, National Industries Inc., Fort Wayne, Ind.

* * *

RAYMOND H. GARDNER has been named acting president, Albion Malleable Iron Co., Albion, Mich., to take the place of COLLINS L. CARTER, president, now in the Army. Mr. Gardner will continue as chairman of the board. THOMAS T. LLOYD, vice president, has been made plant manager in direct charge of factory operations. EMIL F. HOLTZ, personnel manager, has been made plant superintendent to succeed KENNETH H. HAMBLIN, resigned.

* * *

GEORGE G. RAYMOND JR. has been elected assistant treasurer, Lyon Raymond Corp., Greene, N. Y., and is serving as sales promotion manager.

* * *

EDWIN H. BROWN has been elected a vice president, Allis-Chalmers Mfg. Co., Milwaukee, in charge of engineering and development. Mr. Brown formerly was manager and chief engineer of the engine and condenser department for seven years.

♦ ♦ ♦

WILLIAM T. BEATTY, for approximately 25 years connected with the J. W. Paxson Co., has been appointed representative of the Pennsylvania Foundry Supply & Sand Co., Philadelphia, in the Baltimore area. WILLIAM E. LONG, formerly associated with Taggart & Co., the Kennedy Valve Mfg. Co., and the Foundry Rubber Compounds Co., has been made New England sales manager of the Pennsylvania Foundry Supply & Sand Co.

* * *

JOHN SONNENFELD, formerly works manager, Keokuk Steel Casting Co., Keokuk, Iowa, has been elected vice president in charge of operations of that company. Mr. Sonnenfeld began his career in the steel foundry industry as a chemist and metallurgist for La Brugeoisc, Belgium, and later he became superintendent of that foundry. He then came to the United States where he joined the Reed Foundry & Machine Co., Kalamazoo, Mich. Later he became connected with the Lima Steel Casting Co., Lima, O., and in 1919 was associated with the Mathews Steel Casting Co., Cleveland. His next position was superintendent with the Reading Steel Casting Co., Reading, Pa., and he later joined the Dayton Steel Foundry Co., Dayton, O. Mr. Sonnenfeld resigned that position to become connected with the Keokuk company in 1938.

William C Carter

O A Kelke

Robert Clade

William E. Jones

MOLYBDENUM ENLISTS FOR THE DURATION

The enormous increase in requirements of molybdenum has necessitated the War Production Board Order M-110, placing molybdenum consumption under allocation control...Our metallurgical research staff is fully engaged in war work. At our mine, mill and converting plant, every effort is being made towards maximum production.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.
MOLYBDIC OXIDE—BRIQUETTED OR CANNED • FERROMOLYBDENUM • CALCIUM MOLYBDATE

Climax Molybdenum Company
500 Fifth Avenue • New York City

MOLY

among Detroit foundries

By A. H. ALLEN
Detroit Editor,
The Foundry

LIKE the prehistoric dodo, old-line mass production automotive gray iron foundries now are virtually extinct. All there is left is some capacity for making truck castings; cobwebs are covering conveyors, molding machines and pouring systems in foundries which formerly took care of passenger car requirements. Machinery has not been ripped out altogether, because if the war emergency becomes increasingly critical, it may be needed for purposes not now visioned. But plants are idle and workmen and supervisory forces are turning their attention elsewhere.

Steel, aluminum and magnesium have top priority in the foundry field at the moment. General Motors has been investigating the possibility of making steel at the Pontiac foundry and at the Chevrolet gray iron foundry in Saginaw, in addition to the announced project for making steel at the Saginaw Malleable Iron Division.

Buick foundrymen are concentrating on rushing a $10,000,000 aluminum foundry into production, possibly by late summer. Ford already is producing a fair quantity of magnesium castings at a new plant, and recently took bids on structurals for an aluminum foundry of about 250,000 square feet. Further, there are plans for a large jobbing foundry, an extension to the present jobbing shop, required by a new maritime contract taken on by Ford.

These projects, together with the vast new armor plate foundry going up at the Rouge plant, which has been enlarged or revised at least a dozen times since its inception, will make the Ford organization probably one of the foremost sources of cast aluminum, magnesium, iron and steel for war projects. The aluminum and magnesium are required for radial airplane engine construction under way. Principal requirements for steel castings will be tanks and parts for the Consolidated bomber.

Ford engineers, headed by C. E. Sorenson, production chief, for years have been ardent proponents of castings. They pioneered a cast steel crankshaft and camshaft for automotive engines, as well as centrifugally cast steel transmission parts. Some of the parts they have developed for tanks, bombers and other war products, produced by casting, are little short of amazing, and should help to dispel the senseless distrust which some branches of the military services exhibit for castings as an engineering material.

Unconfirmed reports are to the effect that General Motors is considering a magnesium foundry for the Saginaw district, in addition to an aluminum forge shop proposed for that area. The rapidly expanding airplane motor program is placing additional strains on the supply of light metal parts, so the obvious answer is for more new plants.

Chrysler Corp. has started to order machinery for a new airplane motor plant to be located in the Chicago district, where 2000-horsepower Wright engines will be built, further complicating the aluminum supply picture. Studebaker likewise is building a somewhat smaller Wright engine, and reportedly has contracted with a Northeastern Ohio foundry for supplying aluminum cylinder heads, a new plant being required for the purpose.

Other expansions in the Detroit area include a new foundry addition by the City Pattern Works, Detroit, and a foundry addition for the United Brass & Aluminum Mfg. Co. Ground has been broken in Michigan for a $36,000,000 magnesium feed plant for Dow Magnesium Corp., affiliate of Dow Chemical Co. Campbell, Wyant & Cannon Foundry Co., Muskegon, is preparing to take over operation of open-hearth furnaces at a plant in Iowa for production of steel castings.

Expansion of the tank program will emphasize the new M-4 medium tank which makes wider use of cast armor plate sections than did its predecessor, the M-3 tank. The M-4 appears to have several different designs, from views which have been released so far. For example, the Fisher Body version uses welded sections of rolled armor for the upper hull assembly, surmounted by the turret casting. The

(*Concluded on page* 124)

Cleaning up aluminum alloy cylinder jacket castings for the Allison V-12 airplane engine at the new aluminum foundry of Delco-Remy division of General Motors, Anderson, Ind. This foundry supplies virtually all large aluminum castings required in this engine, which is now being turned out at a rate highly satisfactory to all concerned

Prime movers

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● The great units of America's transportation system, her trucks and trains, depend heavily upon another transportation system to keep them rolling — the modern conveyer system. Without conveying equipment to speed materials to and from processing machinery, and into the cars and holds of ships, the transportation of vital war material would slow down considerably. Ships would remain longer in port — carloadings would fall off.

Long Mathews engineering hours are devoted entirely these days to the development of equipment for handling war material so that our prime movers can get it to where it is needed in less time.

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(*Concluded from page* 122)

latter incidentally, is reputed to weigh a neat 6 tons as cast. Other versions of the M-4 have cast hull sections. The M-3 used rolled armor plate, cold riveted.

Three types of power for the new M-4 tank have been proposed. One is the Ford 8-cylinder in-line airplane engine which will be produced in the Lincoln plant in Detroit. This engine originally was a 12-cylinder model developing something like 1200 horsepower on the basis of preliminary section tests. Four cylinders were lopped off for the tank version of the engine, and power is estimated at around 600 horsepower.

Chrysler Corp. has developed a hook-up of five 90-horsepower automotive engines for powering the tank. General Motors, in turn, has devised an arrangement of two 6-cylinder diesel engines, placed close together with blower and other accessories on the outside and exhaust manifolds on the inside. These are standard types of diesel engines produced by the diesel division in Detroit, developing about 225 horsepower each. One cylinder block is turned end for end to permit mounting the accessories on the outside. Crankshafts are connected to a twin clutch arrangement which permits operating either one or both of the engines in service. Advantages of the diesel in tank installations is that cruising range is about doubled for a given amount of fuel, the engines are much easier to service than a radial aircraft-type of engine, such as used in the M-3 tank, and the fire hazard is minimized with oil fuel. Furthermore, characteristics of the engine provide high torque at low speed. Tests also have shown that the diesels will operate equally well with gasoline fuel, so a sudden shortage of oil in the field would not prove disastrous if gasoline should be available. The diesel unit for tanks is now being produced in volume, the Cadillac foundry in Detroit supplying the engine blocks. Expansion of the Diesel Division is now in progress to meet the stepped-up demand for tank power plants.

Armor plate requirements for the tank program are tremendous. One prime contractor has contracts totaling $300,000,000 for this plate and has organized a network of subcontractors to assist in the production, machining, heat treatment and other phases.

Centrifugally cast steel barrels are being used in one type of 40-millimeter antiaircraft gun being produced for the Army in the Detroit district. It is understood that these barrels are cast vertically, and in contrast to most types of cylindrical castings produced by the centrifugal process, these parts are cast solid and then bored out. The theory apparently is that the impurities in the metal will remain at the center and can be bored out, leaving the densest metal in the wall of the barrel. However, machining difficulties still are being experienced.

To Check Foundries

Interior Department has lent the Compliance Branch of the Division of Industry Operations, War Production Board, 200 investigators from the Geological Survey, The General Land Office and the National Park Service to conduct a survey of 3200 ferrous foundries which use pig iron in their operations. The purpose of the investigation is to determine inventory conditions and the degree of compliance with priority orders and procedures. Pig iron has been under allocation since August, 1941.

Discusses Care of Rubber Hose

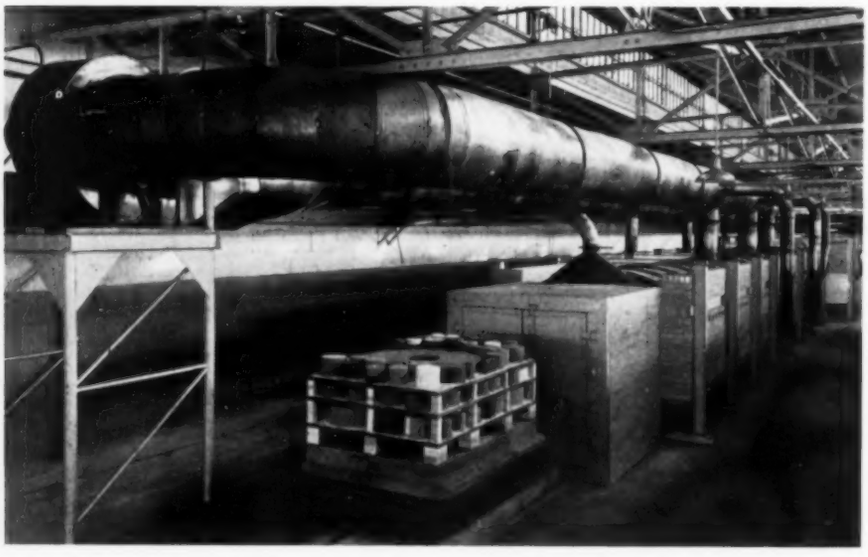
B. F. Goodrich Co., Akron, O., has issued several booklets under the general title, "How To Get the Most Service Out of Industrial Rubber Products". No. 5 of the series deals with rubber hose and offers the following information on air hose:

In air hose, damage from oil is sometimes considered almost a necessary evil. Although oil-resistant compounds have increased the life of air hose many times in the last few years, care in protecting the hose from overheated oil can still add to its service life. Special helps to keep in mind are:

1. Keep compressors in good repair, particularly the 'after-coolers.'
2. Keep cover clean. Wipe off oil as soon as possible with clean waste or cloth. Wash off mud or concrete with water.
3. Do not use pipe nipples or ordinary shank couplings which are held in place with standard bands or clamps. High pressure couplings with clamps which fasten to the shank are safer. The quick detachable type is convenient and satisfactory for use on portable compressor and light pneumatic tool service.
4. Turn hose end for end at intervals to alternate positions of greatest exposure to oil, and also of greatest flexing.
5. Avoid kinks—and when they do occur, untwist with care.
6. Wash out with clean water and drain thoroughly if hose is to be stored.
7. When air tool is not in use for any length of time and job is still working turn off air at compressor to stop flow and open tool nozzle or outlet valve to release pressure on hose carcass. Trapped air under pressure weakens fabric or braid and shortens hose life."

Warm Air Furnace Group Formed

Warm air furnace subcommittee of the plumbing and heating industry advisory committee, War Production Board, recently has been organized. Committee members are: H. S. Sharp, Henry Furnace & Foundry Co., Cleveland; Cliff Ackerson, Agricola Furnace Co., Gadsden, Ala.; W. L. McGrath, Williamson Heater Co., Cincinnati; L. R. Taylor, International Heater Co., Utica, N. Y.; Frank C. Packer, Payne Furnace & Supply Co., Beverly Hills, Calif.; A. W. Wrieden, Lennox Furnace Co., Syracuse, N. Y.; R. S. McNanney, Dowagiac Steel Furnace, Dowagiac, Mich.; F. H. Faust, General Electric Co., Bloomfield, N. J.; Robin Bell, Surface Combustion Co., Toledo, O. W. W. Timmis is government presiding officer.



Macklin Co., Jackson, Mich., recently has completed another addition to its plant, which will increase the production of vitrified grinding wheels by 30 per cent. A continuous kiln, housed in the new building, is shown in the illustration

This "DRUM" keeps time with accelerated ammunition production

Cast Everdur Copper-Silicon Alloy drum for pickling brass cartridge components with plain, dilute, hot sulphuric acid.

It's of cast Everdur...strong...corrosion-resistant...economical; it helps pickle and clean brass cartridge components

Production of Everdur* for such war-vital use as this pickling drum, has been vastly increased; its value for this and many other types of service is widely recognized... Everdur is a high strength, corrosion-resistant engineering metal—furnished in four standard copper-silicon alloys which lend themselves to fabrication by all usual methods, including welding.

The casting alloy, Everdur 1000, is supplied in 25 lb. notched ingots, and is handled efficiently and economically with regular brass and bronze foundry equipment. Everdur 1000 is a high copper alloy held to definite specification, of which the following is the nominal composition:

COPPER	94.90%
SILICON	4.00%
MANGANESE	1.10%

Our publication E-1, "Everdur Casting Ingots", contains a detailed description of physical properties and foundry practice. Copies free on request. 42103

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the adventures of Bill

BY PAT DWYER

Drawings By PICHEY

OWING to the fact that I am not a bird," said Bill, "and therefore cannot be in two places at the same identical time, I missed an interesting session at the recent convention and exhibit staged by the American Foundrymen's Association in this old home town, to wit, Cleveland, Ohio, U. S. A. I fully intended to sit in at this particular session and lend the old moral support and all that kind of thing while the victims were going through the ordeal, but on the way down to the meeting I ran into J. B. Greathouse and I was stymied for an hour. By that time the session was over and I did not have a chance to lead the applause and so forth."

"I have no doubt," I said, "that your motives were of the best, prompted by a heart of gold and other organs of equally high value. However, since I am endowed only with the common or garden variety of organs and other physical characteristics, perhaps you will be kind enough to come down to my level. In the late 19th century lingo, come down off your perch, and translate your high faluting double talk. What session? When? What ordeal and what applause, and finally who is J. B. Greathouse and are you sure the middle letter is a *h* and not an *I*?"

"Old J. B.? If I had said the jay bird, you would have spotted him in a minute. The long gander who worked on the last floor in the dog house in what's-his-name-shop in Lowell the summer me and you were working for Billy Doherty. One of the foundry wags christened him the jay bird, partly on account of his initials, but principally in recognition of the high, agonized voice he employed when calling for a lift or a drop of feeding iron. So far as I know no person ever actually attempted to trace his ancestry, but in the little passages of arms which enliven the daily grind, it was hinted more than once that a little earnest spade work on the part of an investigator would bring up traces of a calliope or a banshee, probably both."

"The old jay bird himself! What is he doing now? Doing a radio program under the name Costello?"

"No, but he could. He still has the voice. For several years he has been running a shop of his own. From his appearance and what he told me he does not need to touch his hat or say Sir to any person. Took him an hour to tell me his story and as I said thus prevented me from being among those present at the session where the A.F.A. conferred honorary life membership on you. I hope you had a few well chosen words on tap."

"Well," I said, "'tisn't for me to say whether or not they were well chosen. In a general way I pointed out that some men are born great, some men achieve greatness and some men have greatness thrust upon them. I was not born great. In fact if I was pinned down in a corner, I could not produce any evidence and certainly I could not produce any witness to prove that I actually *was* born. Strange as it may seem, I have no recollection of this highly remarkable and to me important event. The stork in those far away days—I am speaking now of course from hearsay—went about his business at night in a kind of furtive and secretive manner. He left no foot prints, feathers or other clues. Far different from the present day broadcasting bird.

So! That's how it is done!

"Needless to say, in the preceding paragraph I have reference to the Irish stork, whose home according to tradition—real genuine right hand tradition—is in the vicinity of Blarney Castle. It has been alleged in certain quarters that he—I am talking now about the stork, not the castle—the stork rubs each baby puss on the blarney stone before spreading his wings—I am still speaking of the stork—babies may be angels but they have no wings—before he spreads his wings and takes to the air, but I wouldn't know about that.

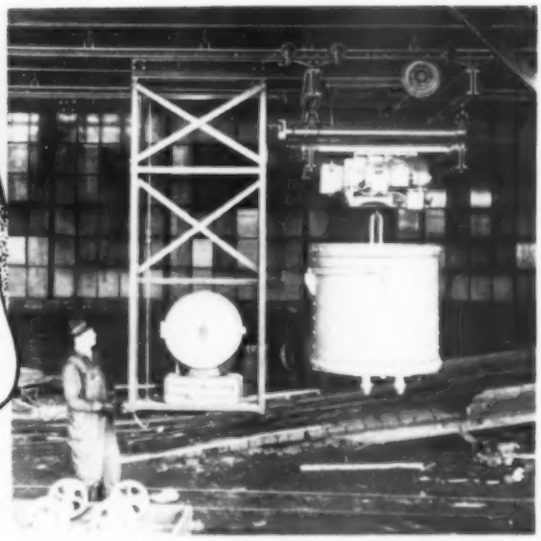
"At a later period after I had set up my own vine and fig tree—the poetic reference is rather more impressive and alluring than the actual reference, two rooms on the third floor of a house owned and occupied by a livery stable man—horse garage to the younger members—the Great Western or this-side-of-the-ocean stork became a regular visitor. Never failed to leave a little present. I never held anything against him, but other members of the family showed a singular lack of enthusiasm for any prospective visit.

"Several months ago in a national and highly popular magazine I read a little story that seems to fit in here—well—maybe in a kind of negative manner. Old Paddy Brannigan, 90 years old, life long resident of Connemara and a bit of a crab with a red veined nose like a gravenstein apple—well anyway the old bird died—Brannigan, not the stork—and as they used to say in the Old Testament—he was gathered to his fathers. When the neighbors were leaving the house after the wake, Mrs. Geohegan turned back for a final word with the widow. Friends since the long ago days of their youth she laid her hand in sympathy and affection on Mrs. Brannigan's shoulder."

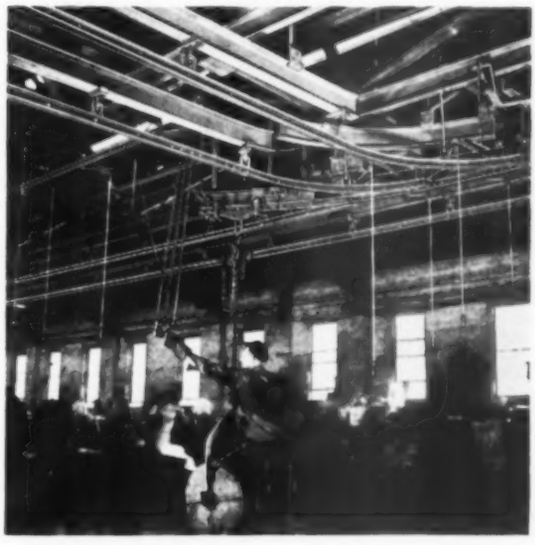
"'Fifty years ye wor together,' she said. 'Wasn't it Mary? Fifty

(*Continued on page* 128)

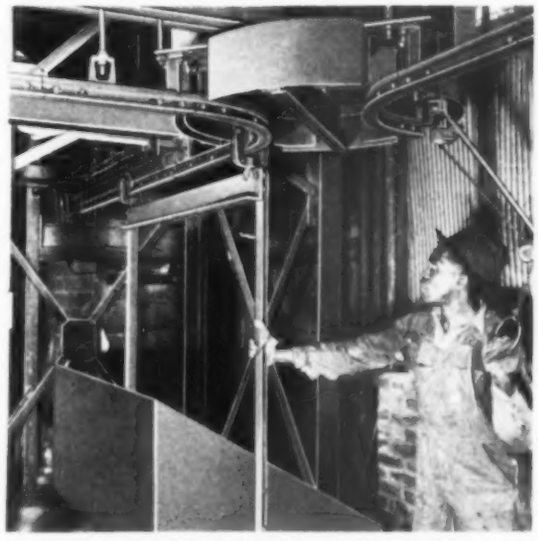
You Can Accelerate Your Rate of Production as Rapidly as You Release Man Power from Handling Labor



Power operated charging crane with built in scale and electric hoist.



Airlift quickly raises ladle to track on upper level.



Special rotary switch with charge carrier rolling on elevator to charging floor.

THE battle of production, too, can be won in the air. That is, on overhead handling equipment.

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You can accelerate your rate of production as rapidly as you release man power from handling labor—illustrations show how this can be done with American MonoRail Equipment.

Let an American MonoRail Engineer explain many other advantages of overhead handling equipment. Regardless of size of installations, from the simplest to the most complicated, our engineers can help solve your handling problem. This service is without cost or obligation. There is no delay or shut-down during installation. Write today.

Write for Blue Book illustrating hundreds of MonoRail installations.

THE AMERICAN MONORAIL CO.

13104 ATHENS AVENUE ★ CLEVELAND, OHIO

(*Continued from page* 126)

years?'

"The widow slowly rocking back and forth in her old straw bottom chair, hands meekly folded inside a stiffly starched black apron, slowly nodded her head.

"'Tis so Annie. Fifty years. Fifty long, long years.' She looked over one shoulder and then over the other. Then she sat up straight and looked her old friend straight in the eye, 'Aye,' she clinched her two remaining teeth. 'Fifty years—an' I never liked him!'

"Well, in one capacity or another I have been in the foundry over 50 years and I always liked it. I like the work. I like the constant daily problems. I like to see the flying sparks, the white hot metal. I like the smell of the shop and I like to hear the roar of the blast, the signal in the good old days to hang up the shovel and rammer and wait for the iron; an extra grand wait when the big ladle went under the spout.

"I have liked the men with whom I have been fortunate enough to be associated in the shop, in the office, in the local and national associations. As Tiny Tim said on a certain memorable occasion, 'God bless them, every one.' They are all members of the immortal order of Stout Fellas.

"First as a wandering pilgrim and later as a representative of that great family journal THE FOUNDRY, 2 bucks per year to one and all, I have visited numberless foundries and nearly every foundry group in the country at one time or another. I would be singularly ungrateful if I failed to testify to the cordial and friendly reception accorded me on these occasions. I have known the great, the near great and in some instances the pseudo great in the foundry industry and that brings us back dear brethern—and I suppose you will say about time—by a slightly circuitous route, it is true, but still back to where I started, to the text of today's lesson: 'Some men are born great. Some achieve greatness and some have greatness thrust upon them.'

"As I said in the beginning, I was born of poor but reasonably honest parents and all that kind of thing, but definitely I was not born great in the ordinarily accepted sense of the term. Natural modesty prevents me from touching too heavily on the second item, achieving greatness. However, I think I can safely go to town on the third and last item, greatness that is thrust upon one. The unanimous—I believe it was unanimous?—decision of the American Foundrymen's Association directors and board of awards in conferring on me the 33rd degree, honorary life membership in the association, is highly appreciated. As I understand it—and I hope no person will rise to tell me I am all wet—this elevation confers on the recipient the blessed privilege of paying NO further dues, fines, taxes, surtaxes, fixed and floating overhead charges and special assessments.

"I wonder what that dear Mr. Morganthau down in Washington, will think of that!

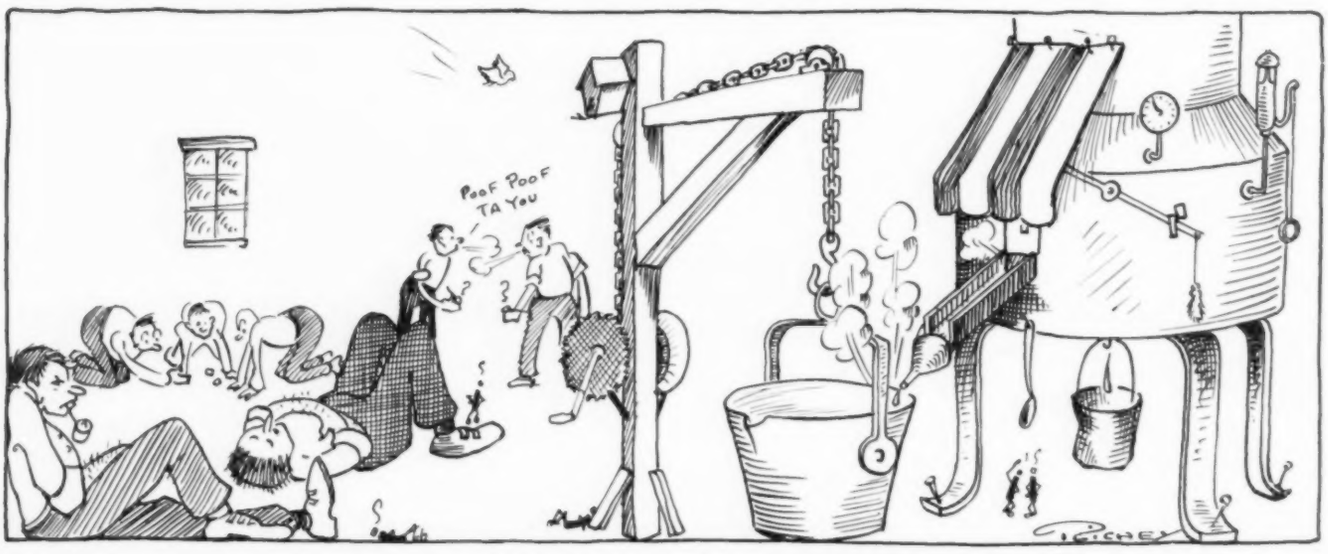
"I trust I shall carry the shield with dignity and honor, or at least with sufficient dignity and honor to associate with the other exalted members of the inner circle and give them no reason or excuse to look down their noses or to institute impeachment proceedings."

"Well," said Bill, "I'll tell you. That kind of rannygazoo is all right at one of these here now hail fella well met sessions. It would not go over so hot where a man asks a serious question on some phase of fundry practice. I had an inquiry the other day from a man who wrote that he was casting from 15 to 20 chilled wheels 12 inches diameter per heat. The wheels are left in the molds 7 or 8 hours. Some wheels break in service. He felt that the wheels should be treated in a soaking pit. He would appreciate an opinion on this point, also on the construction of a suitable pit and the proper temperature cycle.

"Cracks in mine car wheels may be traced to one of two main causes, unsuitable metal composition, or lack of suitable heat treatment. In some instances a combination of both causes is responsible. Since the wheels do not crack until they have been in service, it is reasonable to assume that the analysis of the iron is suitable and conforms approximately to the following: Silicon 0.75 to 0.85 per cent, sulphur 0.09 per cent, phosphorus 0.30 per cent, manganese 0.60 to 0.80 per cent. Therefore in this case in all probability, the cause of the cracking may be charged up to lack of heat treatment. By leaving the castings in the molds a partial annealing effect is secured, but it is not sufficient to eliminate all strains resulting from the chill effect on the tread.

"Where these wheels are cast in wheel foundries, they are shaken out as soon as possible and dropped into the annealing pits. These pits vary in size, shape and constructional features to a remarkable extent. In one prominent foundry steel tanks fitted with detachable bottoms and covers are employed. The wheels are lowered through small holes in the covers. They are dumped promiscuously. No attemp is made to stack them in a straight column as with standard size car wheels. The tanks are lowered into brick lined pits in the floor. They may be loaded before or after they are placed in the pits. The castings remain in the pits for

(*Concluded on page* 178)



The boys enjoy a little innocent recreation while the crane ladle is under the spout

SAVING IN FOUNDRIES ACROSS THE NATION

Above: From a large Eastern foundry. "Molds uniformly baked at 650° F. Much better results and economy compared with previous ovens—dependable and no maintenance to date." The service given resulted in large repeat orders.

Above: From a large Midwestern foundry. "Cores perfectly uniform with faster bakes and better fuel economy. Many visitors, always welcome, have been favorably impressed with this equipment. We are 'sold' on the character of your business dealings."

Below: From a Pacific Coast foundry. "Results are perfect. Large and small cores, irrespective of location on the car, come out perfectly baked. This oven exceeds our expectations."

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Industrial Ovens for all purposes

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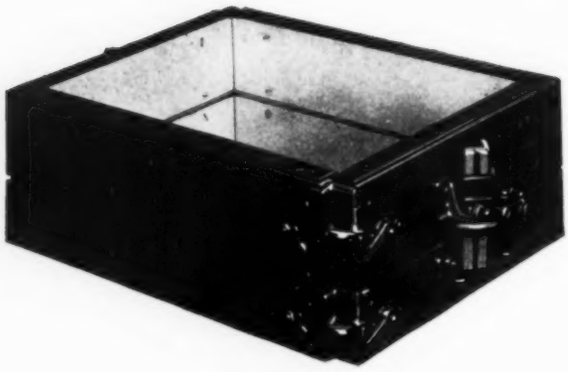
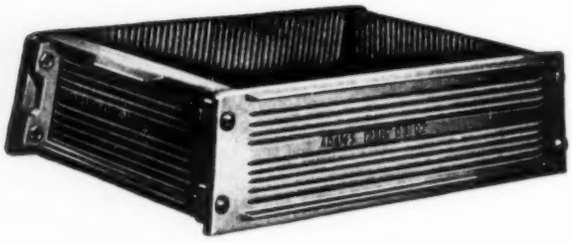


ADAMS CHERRY SNAP FLASK

Custom-built, any desired size, with straight sides or any desired taper. Wide-V, double-V or round pins—triple-locking snaps or lever latches. Trimmings fully adjustable to compensate for wear.

ADAMS CHERRY SLIP FLASK

A very convenient flask for machine or bench, made to your dimensions. Wide-V, double-V or round pins. Dependable and easily operated sand strip mechanism.



ADAMS CAST IRON JACKET

The patented construction of this jacket, involving a combination of horizontal and vertical ribs and machined corners, provides maximum rigidity with minimum weight. Any size, straight or tapered.

ADAMS STEEL JACKET

The strongest and most rigid jacket on the market, to effectively handle the most difficult jobs. Made in any desired size, straight or tapered.

THE ADAMS COMPA

MOLDING MACHINES · FLASK

This is what
Adams Jolt Squeezers
will do for you!

They Will Reduce Production Costs. They are efficiently designed with a minimum number of working parts, and controls are accessible for quick handling.

They Will Assist in Reducing Losses. Close control of jolting and squeezing operations assures the production of uniform molds.

They Will Help to Maintain Uninterrupted Production. Simple design and durable construction provide insurance against production delays.

They Solve the Skilled Labor Shortage. Their operation has been so simplified that no special skill is required to operate them successfully.

Adams Jolt Squeezers are made in both Side Rod Type and Post Type, with 10" or 12" cylinder, stationary or portable. Same sizes available in Jolt-Squeeze-Pattern-Draw machines.

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EQUIPMENT · Established 1883

Walton L. Woody

J. E. Crown

S. V. Wood

H. S. Simpson

Vaughan Reid

A·F·A ELECTS SIX DIRECTORS

I. R. Wagner

ELECTION of six new members to the board of directors of the American Foundrymen's Association was announced at the annual business meeting of the association held on Wednesday, April 22, during the Cleveland convention. The following will serve for a 3-year term: HERBERT S. SIMPSON, retiring president, A.F.A., and president, National Engineering Co., Chicago; JAMES E. CROWN, master mechanic, U. S. Naval Gun Factory; Washington; I. R. WAGNER, general manager, Electric Steel Castings Co., Indianapolis; SHELDON V. WOOD, president and manager, Minneapolis Steel Castings Co., Minneapolis; WALTON L. WOODY, manager, National Malleable & Steel Castings Co., Sharon, Pa. VAUGHAN REID, president, City Pattern Works, Detroit, was elected to fill the unexpired term of the late W. J. CORBETT.

Herbert S. Simpson

HERBERT S. SIMPSON, retiring president, has been connected with the foundry and foundry equipment industry for many years. He was born in Minneapolis and moved to Chicago when a boy. His first position in industry was with the Hatfield-Penfield Co., Bucyrus, O., where he later became assistant to the president. In 1917 he became associated with the National Engineering Co., Chicago, and has been president since the company was incorporated. He is a past director and immediate past president of the American Foundrymen's Association and a past president of the Foundry Equipment Manufacturer's Association. For many years he has supported various research activities and has been active in many other phases of association work.

Walton L. Woody

WALTON L. WOODY, active for many years in the malleable division of the association as member of various committees and first chairman of the Northeastern Ohio Chapter of the A.F.A., was born in Terre Haute, Ind., where he was graduated from Rose Polytechnic Institute with a degree in chemical engineering. In 1914 he entered the Indianapolis laboratory of the National Malleable & Steel Castings Co. He was transferred to Toledo and later to Cleveland where in turn he served as chemist, metallurgist and assistant superintendent. For a year he was manager of the Chicago plant of the company and then served as manager in the Cleveland plant for 11 years. Four years ago he was appointed to his present position, manager of the company's plant in Sharon, Pa.

James E. Crown

JAMES E. CROWN, vice chairman, Chesapeake Chapter A.F.A., was born in Washington. After grade and high school courses he studied mechanical engineering at George Washington University. In 1904 he started to work as an apprentice for the government and in succession was promoted to molder, estimator and supervisor. In 1916 he taught at New York High School, New York. He returned to the government as supervisor the following year and in 1919 was appointed to his present position, master mechanic. He has presented papers before many technical society meetings dealing with bronze pressure castings and the founding of aluminum bronze.

I. R. Wagner

I. R. WAGNER, chairman of the Central Indiana chapter for 2 years and at present serving on the board of directors, was born in Reading, Pa., and in 1912 was graduated from Shamokin, Pa., High School. He then entered the employ of the Alan Wood Iron & Steel Co., Ivy Rock, Pa., as a helper in the maintenance department. After a short period he was transferred to the chemical laboratory as test boy. In 1915 he joined the staff of the Midvale Steel

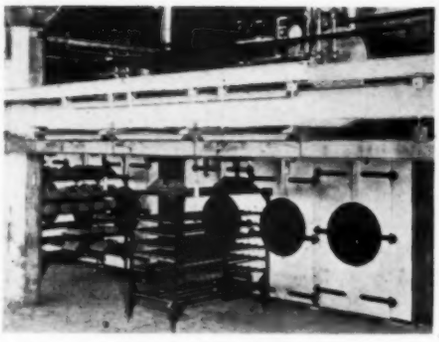
(Concluded on page 185)

Guard

EVERY CASTING FOR WAR PRODUCTION

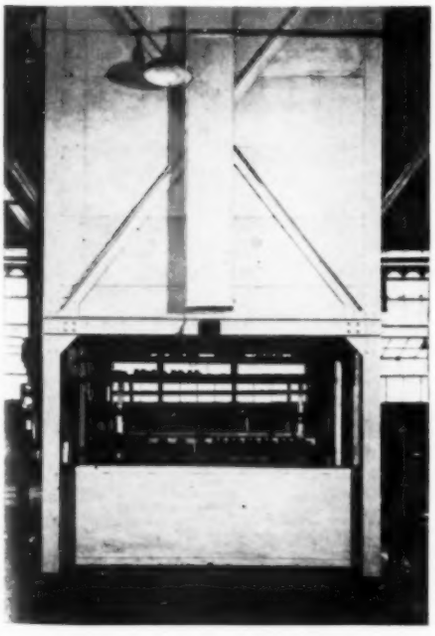
against those slow-down Saboteurs "Rejects" and "Make-Overs" which follow improper core baking and mold drying

use CARL-MAYER Core and Mold Ovens



Part of large Carl-Mayer Recirculating Gas Fired Rack Type Oven installation at The General Electric Co.

Another large Carl-Mayer Monorail Type Conveyor Oven (like this) for Eclipse Aviation Magnesium Plant



Typical large Carl-Mayer Vertical Oven as installed for Electric Autolite, Fremont Foundry, Cadillac, General Motors and Packard Motor Co.

Carl-Mayer Core and Mold Ovens are adjudged the outstanding investment by leading foundries, and they say it with repeat orders (an average of more than three per customer).

Carl-Mayer Core and Mold Ovens have speed and dependability in extra measure, qualifications so urgently needed in the production of cores and molds for war equipment castings.

To save time, WIRE for a Carl-Mayer Engineer or Illustrated Bulletin No. 141.

Over 20 Years' Experience

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Core and Mold Ovens of All Types and Sizes and for All Fuels

CHAPTER
and
GROUP SECRETARIES
1941 - 1942

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Western New York

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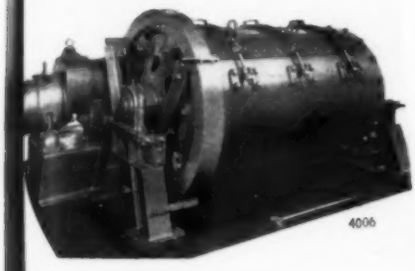
George Dreher
Wisconsin

(Please turn to page 136)

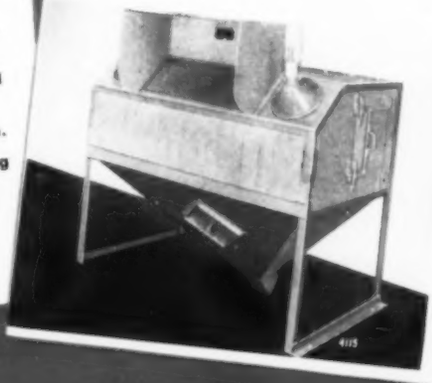
For Cleaning *Faster, Better* and at *Lower Cost*
Choose from the SLY Complete Line of Foundry Cleaning Equipment

SLY TUMBLING MILLS



1. Heavy forged steel trunnions, extra heavy roller bearings.
2. Special door locks — easily operated.
3. Extra heavy gearhead motor.
4. Integral motor platform.
5. Loading and unloading from either side.

SLY BLAST CABINETS



1. Two lights mounted at front to illuminate castings.
2. Operator's eyes shielded by protective hood.
3. Easy loading and unloading of castings.
4. Used for thorough cleaning of small and intricate parts, or as an auxiliary to larger units.

SLY BLAST ROOMS

1. Overall down-draft ventilation.
2. Ample illumination.
3. Lined throughout with 3-16" wear plates.
4. Floor of grating and perforated plates.

SLY AIRLESS BLAST CLEANING EQUIPMENT

MILLS AND TABLES

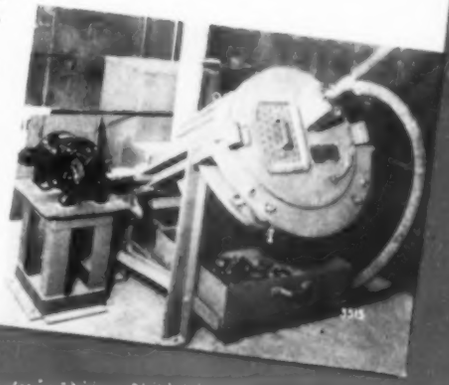
Exclusive wheel features for fast and economical cleaning.

SLY DUST FILTERS

1. More filter cloth—hence greater filtering capacity.
2. Filter bags under tension (patented) insure: (a) minimum resistance to air flow, and (b) complete dust removal.
3. Simpler shaker mechanism—less moving parts, less maintenance.
4. Bags more easily replaced.
5. Automatic control — any degree.

SLY BLAST MILLS

1. Handles quantities of castings, forgings, stampings, hardened steel parts.
2. Tilted barrel with rolling action.
3. Convex perforated bottom plate forms bottom of barrel.
4. Work is constantly turned bringing bottom pieces to top.
5. Stationary head of barrel has large door for loading.



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★

CHAPTER and GROUP SECRETARIES

1941-1942

(*Concluded from page* 134)

G. L. Kennard
Northern California

W. B. Coleman
Philadelphia

J. M. Johnson
Quad-City

L. G. Tarantino
Connecticut Nonferrous

H. M. Wood
Cincinnati

R. A. Thompson
Central Indiana

M. A. Amos
Western Michigan

L. H. Denton
Chesapeake

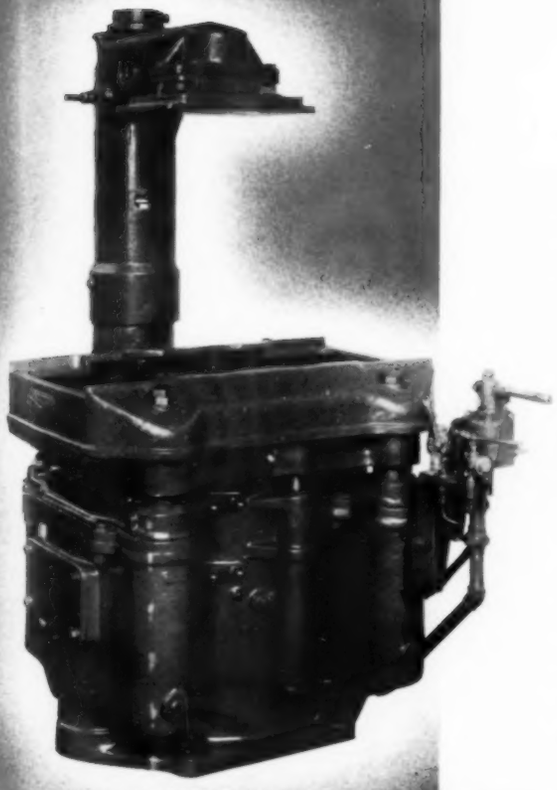
H. C. Cummings
Reading

J. M. Lathrop
Northeastern Ohio

L. L. Andrus
Michiana

J. L. Carter
New Jersey

He Specializes in Helping Speed Production



Osborn No. 814P Jolt Squeeze Stripper for high speed, high production.

Proven, thorough-going knowledge of good moulding practice is the background for E. A. Blake's value to foundries in the Detroit district, where he is Osborn's Sales Engineer. Mr. Blake's ability and training as a practical foundryman and experienced pattern maker typify the kind of service that he and the Osborn organization behind him are contributing every day to the cause of "more castings, better castings, at lower cost."

Representative of the many time- and cost-cutting installations Mr. Blake has helped his customers to perfect is the one illustrated on the next page. The machines are Osborn No. 814P Jolt Squeeze Strippers. A single unit is shown at the left. This Osborn machine is expressly designed for high speed and high production, characteristic of the work Detroit is doing today. Osborn has stepped up output enormously for others; perhaps we can for you, too. Complete specifications are given on the next page. For detailed information write today to

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OSBORN

MOULDING MACHINES

Let's look AT THE SERVICE RECORD!

This battery of Osborn No. 814P Jolt Squeeze Stripper Moulding Machines is shown in operation at the foundry of the Budd Wheel Corp., Detroit, Mich. Producing brake drum moulds at an average rate of approximately 115 moulds per hour, for each pair of machines, this equipment already has established a service record of several million moulds.

Specifications
Osborn Jolt Squeeze Stripper
No. 814P

Width of Opening in Lifting Frame	14″ to 16″
Capacity at 80 lbs. Air Pressure . .	700 lbs.
Jolt Cylinder Diameter	6½″
Squeeze Cylinder Diameter	14″
Pattern Draw	6″

NOTE: Machines of similar design and construction are available in the larger Squeeze Cylinder diameters.

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OSBORN

MOULDING MACHINES

A·F·A CONVENTION

Gives Impetus to War Production

(*Continued from page 97*)

by the absence of co-operation and exchange of ideas between foundrymen, as in the United States.

Mexican foundries have the task of furnishing to local industry some of the new machinery and spare parts which formerly were obtained from Europe or the United States but which now are difficult or impossible to obtain, it was pointed out in a paper on "The Foundry in Mexico" by H. H. Miller, Miller Brass Foundry, Torreon, Mexico. A large part of the Mexican foundry business consists of the making of castings for new special machinery and spare parts for the various equipment required by oil wells, railroads and cotton, sugar and cement mills. Practically all of the heavy machinery used by the three Mexican factories and one in California devoted to extracting rubber from guayule was manufactured by the Torreon Foundry & Machine Co., Torreon, Mexico.

Railroads have their own iron and brass foundries and machine shops, while practically all of the smelters, industrial plants and large mines have machine shops and, in some cases, their own iron and brass foundries. Most of the iron foundries also make brass, the majority of the brass being melted in tilting oil furnaces. Some foundries use crucible furnaces. Very few molding machines are in use in Mexico. A large part of the brass castings made in Mexico comes from scrap, and while scrap quality often is poor, consumers generally are not exacting in their requirements.

The Brazilian foundry industry consists of not more than 400 plants, including several modern and highly mechanized foundries but also many plants lacking up-to-date equipment, it was explained in talks by Dr. Miquel Siegel, Instituto de Pesquisas Technologicas, and H. A. Hunnicutt, Industrias Chimicas Brasileiras, both of Sao Paulo, Brazil. However, a trend toward mechanized foundries — carefully planned and located in adequately planned buildings is rapidly developing, the former stated.

Brazilian cast iron lacks uniformity. This is partly because of the foundryman's lack of knowledge of modern practice and partly the result of variations in pig iron composition. The country's blast furnaces are small and pig iron shipments generally are made up of many heats. Typical iron composition is: Carbon, 3.20 to 3.60 per cent; manganese, 0.20 to 0.30 per cent; sulphur, 0.01 to 0.05 per cent; phosphorus, 0.20 to 0.30 per cent; and silicon 1.00 to 4.50 per cent. Wood charcoal is the blast furnace fuel.

Two Brazilian institutions are attempting to promote the technical aspect of the foundry industry, the National Technological Laboratory in Rio de Janeiro, and the Institute of Technological Research, a semi-autonomous Bureau of Standards for the State of Sao Paulo. Dr. Siegel heads the foundry department of the latter which includes an experimental foundry of the most modern design. The department has been providing technical assistance to foundries since 1939, thereby helping to offset the scarcity of technical foundrymen and metallurgists.

Dr. Siegel gave a resume of cast iron foundry practice in his country. Most coke used is imported from England and is preferred to American coke. Both molds and cores generally are made by hand. Sands used are not satisfactory for green sand molds, and the recent trend is toward use of synthetic sands. Skilled pattern makers are relatively few in Brazil and the products of cabinet makers frequently employed for this work cause trouble for the molder.

Slides showing some of the larger and more modern Brazilian foundries and their products included Cia. Lidgerwood Industrial and Bardella S. A. of Sao Paulo, and the I.P.T. experimental foundry.

WAR PRODUCTION SESSIONS

Cover Many Phases

THE Navy is attempting to stabilize design of castings and other armament parts as much as possible and to minimize changes after production starts, the special war production session on Tuesday was told by Rear Admiral George Pettingill (retired) commandant and superintendent of the Naval Gun Factory, Washington. Chairman of the meeting was Fred J. Walls, International Nickel Co., Detroit.

The admiral's paper, presented by J. E. Crown, master mechanic of the factory, declared that "quantity, speed and quality" is what the Navy wants and expects from the foundry industry. It was pointed out that designs of castings must be changed in some instances in order to keep pace with developments in warfare, but that the Navy is anxious to cooperate in eliminating red tape and production delays.

Facilities of the Navy's research laboratories are available to foundries filling both prime contracts and subcontracts. In addition, the department is open to suggestions regarding changes in specifications for materials and casting designs, it was stated.

Foundrymen were asked to be patient with Navy inspectors. The need for a large increase quickly in the size of the staff of inspectors has made it necessary to train inexperienced men, and time will be required to perfect a smooth-working organization, it was explained. That the inspector is not always right, even though the basic system of inspection is correct, was stated as being the Navy's attitude.

In praising activities of the steel foundries with respect to standardization of specifications, the admiral expressed regret that the nonferrous group has not effected similar results. Applications of various grades of cast metal in armament production were described briefly, with the added remark that malleable iron is being considered for additional uses.

A special war production session was held Thursday morning at which William F. Patterson, chief, Federal Committee on Apprenticeship, Washington, was the principal speaker. Dean C. J. Freund, University of Detroit, Detroit, served as chairman.

Mr. Patterson discussed, "Training Methods for War Production". In introducing his talk Mr. Patter-

son complimented the A.F.A. on its apprentice training committee organization and said that the association's work has been used as a model for other industries which are now beginning apprentice training programs. The speaker declared that the next 5 months will be critical in the war production effort in supplying enough material, in time, to our armed forces. Since the production of the foundry industry is basic to all war production, it will be called upon to do even more than it is doing at this time.

Those companies which have had long range apprenticeship programs are finding it less difficult to increase their production to a two and three shift basis than those concerns which have had no training programs. The apprentice and his all around training is necessary in war production.

Deferment Is Granted

Thus far selective service has been lenient in deferring apprentices of more than 1-year indenture in the critical industries. However, Mr. Patterson pointed out, that with the increased demand for manpower by the armed forces, the selective service boards of necessity will become more strict in their rulings. He felt confident though that deferment would be granted to an apprentice if the company gave proof that another person was being trained in the shortest possible time to replace him. To compensate for the loss of men through selective service, Mr. Patterson said younger apprentices would have to be obtained so that they would be further along in their training, and of greater value, before they reach the armed service age.

Two other sources of labor supply were suggested. One was the use of women, and the other was the use of physically handicapped. The use of these two groups must be analyzed by individual plants to meet the particular need.

In addition to strengthening and enlarging the apprenticeship program, another source of relief in the national demand for greater manpower is the short term training program for upgrading workers, using the apprenticeship training program as a pattern. He urged that all work be reduced to its simplest components so that less skilled workers can handle each phase of the operation and in that way free the skilled men for the most difficult work.

Training programs are not difficult to organize and operate. Mr. Patterson stated that any person with a reasonable amount of training and skill can do the job. The Federal Committee on Apprenticeship has a field force of 160. Men from that group are available to any plant wishing help in organizing a training program. The government does not want to put the training of manpower on a compulsory basis, so all participation by management is voluntary.

Price control is vitally important to the war effort, Carl G. Holmquist, executive, Copper and Brass section of OPA, told members of the nonferrous and ferrous castings industry in a joint meeting held on Tuesday afternoon.

In this period when we are making every effort to expand production, prices must be stabilized to prevent wide fluctuations which tend to disrupt output, he said. During the last war our war debt was magnified greatly as a result of uncontrolled prices, and everyone knows the disastrous consequences and post war problems that developed because of inflated prices. We must avoid these problems now through effective price control, he added.

It is estimated that at current price levels our national debt will top one hundred billion dollars by the end of the war. Some estimates run even higher. It is not difficult to imagine the position we will find ourselves in if prices get out of hand.

Real sacrifices must be made to hold prices at the requested Oct. 1-15, 1941 level, Mr. Holmquist told members of the nonferrous castings industry. But we must be fired with the realization that we are desperately essential to the war effort. He acknowledged that the nature of the industry makes price fixing difficult, and urged wholehearted cooperation in working out the many problems. Conform to the spirit and letter of the regulations, he said, until the results of the questionnaire can be thoroughly studied.

Right to apply for price exception is open to all who feel that the regulations are working undue hardship; resulting from either sharply rising wages or other cost factors.

D. D. Kennedy, Castings division, Iron and Steel Products, OPA, complimented members of the ferrous castings industry present on the marked progress made in stepping up production and improving quality.

Steel castings and railroad specialties are now controlled under price schedule No. 41, he said. No price ceiling has been established on malleable, high alloy or manganese castings.

Mr. Kennedy said that gray iron foundries are co-operating in holding prices at the Oct. 1-15, 1941 level in line with request made in a letter sent to them Feb. 4. The questionnaires which they have filled out are being thoroughly studied, with the view of determining if the price ceiling during that period is equitable to all concerned. He added that OPA may not set a general maximum price for all castings, and acknowledged that rising wage rates present a real problem.

Some of the important problems to be dealt with among gray iron foundries in any attempt to fix prices are the following: (1) Large labor factor; (2) Increase in labor rates; (3) Great variability in type of work; (4) New work; (5) Geographical location; (6) Metropolitan and small town location.

In the long run it is to our own interests to add as much as possible to make the price control methods work, Mr. Kennedy concluded.

GRAY IRON METALLURGY

And Practice Studied

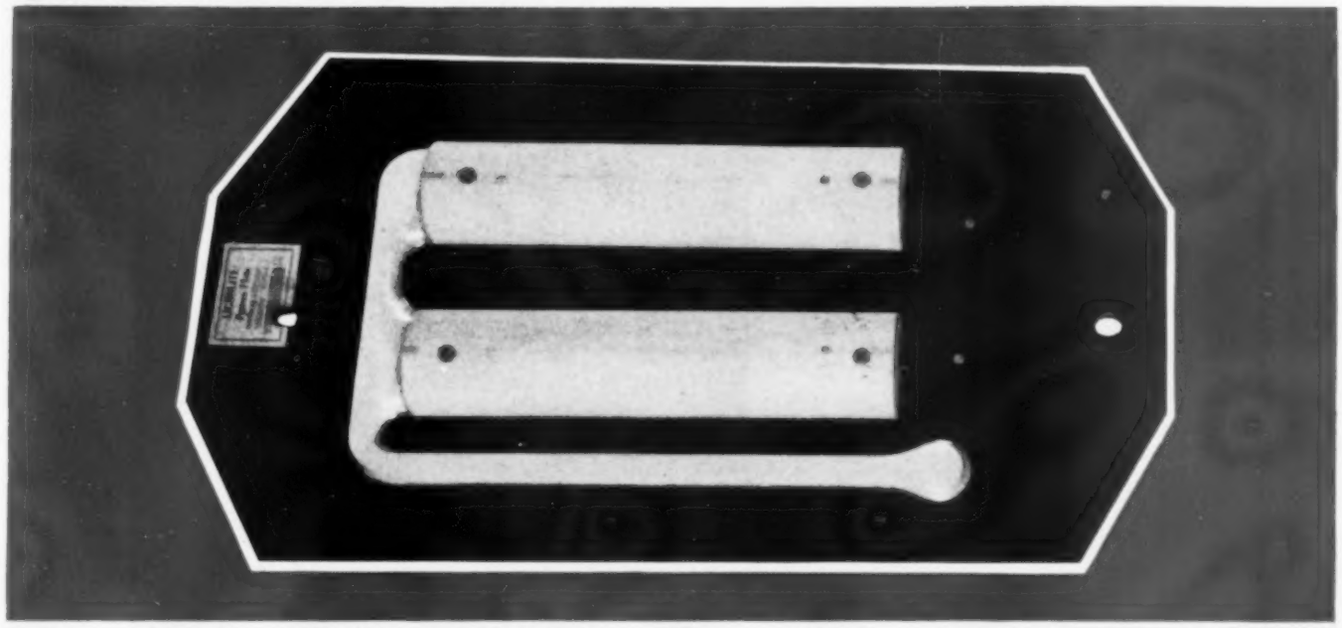
FOUR papers were scheduled for presentation at the Wednesday afternoon session on gray iron under the chairmanship of Max Kuniasky, Lynchburg Foundry Co., Lynchburg, Va. Titles of the papers included "Temperature Measurement of Molten Cast Iron with Rayotube and Optical Pyrometer"; "Electronic Structure and Polymorphism of Iron Alloys"; "Cupola Control"; and "Direct Determination of Combined Carbon in Cast Iron and Steel." Two papers were presented in full. The remaining two were presented by title.

The first paper on temperature measurement prepared by R. H. Koch and Dr. E. A. Schuh, U. S. Pipe & Foundry Co. Burlington, N. J., was illustrated by numerous slides showing application of the pyrometers, also several charts showing in graphic form the results of an extended series of tests. The speaker explained that for measuring temperatures of molten cast iron an instrument to perform under actual shop conditions must have accuracy, precision, ruggedness, ease of calibration and economic operation. He described the results of an intensive investigation of instruments to meet these requirements.

An adaptation of the rayotube instrument coupled with an appropriate recorder, was developed to measure temperature of the molten metal continuously discharging into front slagging cupola spouts. The instrument measuring the total radiation emitted from an immersed refractory tube, also the operation

(*Continued on page* 143)

Use LIGNOLITE Pattern Plates



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- Half the weight of aluminum.
- Easily machined, sawed, drilled, tapped, etc.
- Impervious to moisture, oil, grease, dilute acids.
- Uniform caliper and non-warping.
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STANDARD SIZES—HOW TO ORDER

Available in all flask sizes 7 16″ to 1 1 8″ thick or in 46″ x 46″ size for own cutting—Plates are octagonal shape with 1″ allowance for flask and 2 1 2″ allowance for ears. Order by flask size and specify thickness.

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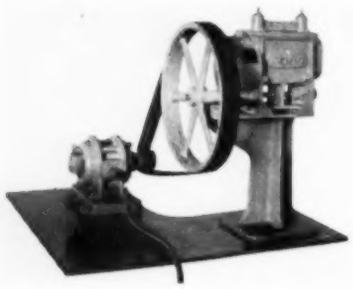
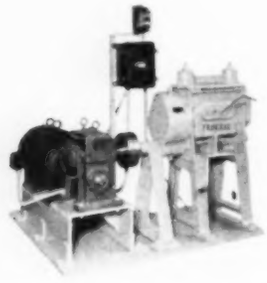
CONSERVE STEEL!

STRAIGHTEN and RE-USE CORE WIRES!

...DO IT FAST, ECONOMICALLY with a CLIMAX WIRE STRAIGHTENER



No. 2-A Climax with V-belt drive, for core wires 1 4" and smaller.



No. 2½-A Climax with gear reducer and motor for core wires 3 16" to 1 2" inclusive.

CONSERVE . . . get the most from what you have! We must all do just that to make our combined war production effort result in final victory.

Foundrymen can save on steel, one of the most essential war materials, by straightening and re-using core wires. The Climax Wire Straightener will do this job fast and economically. It will actually save money on production costs while conserving steel for other purposes.

The Climax is inexpensive to operate—it does not require an experienced operator. It is safe—all moving parts are enclosed. Its sturdy construction minimizes repairs—the rolls and bushings through which the wires pass are of wear-resistant alloy steel. All gears and bushings are extra large.

The Climax is surprisingly low in price—write for detailed information today!

A larger Model (No. 3-A) is available for rods up to ¾ inch round

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CHICAGO—CHARLEROI, PA.—CHATTANOOGA, TENN.—DETROIT—MILWAUKEE—MINNEAPOLIS—NEW YORK—RICHMOND, VA.—ST. LOUIS—UPTON, WYO.

(*Continued from page* 140)
was described. It was found to meet all the requirements for the measurement of the true temperature of molten cast iron. He stated that a further adaptation of the rayotube for quick and intermittent temperature determination of equal reliability is under development. Simultaneous use of the rayotube with the commonly employed optical pyrometer made it possible to segregate the precision and accuracy of the latter. The optical pyrometer, when sighting on the free surface of molten iron, has certain limitations in accuracy due to changing emissivities. He described methods for minimizing errors.

J. G. Donaldson, Battelle Memorial Institute, Columbus, O., presented a rapid and accurate method for determining combined carbon. Results were found to be better in precision and accuracy than those obtained by present methods of analysis and with a considerable saving in time. The speaker claimed that the method requires only 15 minutes per determination. The method is not applicable to chromium steels nor any other steels not soluble in the acid mixture used. The apparatus is conveniently subdivided into small independent units for added flexibility.

Make Castings Machinable

S. C. Massari, Association of Manufacturers of Chilled Car Wheels Chicago, served as chairman and R. G. McElwee, War Production Board, Washington, as vice chairman at the Thursday session on gray iron castings where three papers were presented. The first, "Machinable 1.5 Per Cent and 2 Per Cent Chromium Cast Irons To Resist Deterioration at High Temperatures," was prepared by C. O. Burgess and A. E. Schrubsall, Union Carbide and Carbon Research Laboratories, Niagara Falls, N. Y. The second paper, "Cast Iron—Strength vs Structure," was presented by R. R. Adams, Battelle Memorial Institute, Columbus, O. The third paper, "Metallurgical Study of Cast Iron for Glass Forming Molds," was written by W. H. Bruckner University of Illinois, Urbana, Ill., and H. Czyzewski, Caterpillar Tractor Co., Peoria, Ill.

The first paper described a method of improving 1.5 and 2 per cent chromium cast irons and bringing them within the machinable range through ladle additions of alloys of the silicon-manganese-zirconium type. Experimental work according to the speaker shows that such chromium bearing irons possess a high order of resistance to deterioration on long exposure to high temperatures, specifically 516 hours at 1470 degrees Fahr. or 800 degres centigrade. Resistance to oxidation and growth is not adversely affected by graphitizing ladle additions. The speaker presented a general study of the phenomena responsible for the deterioration of cast iron at high temperatures. Cast irons containing nil to 2 per cent chromium were covered in this study. Oxidation, growth and change in strength on prolonged exposure to temperature of 1472 degrees Fahr. were shown in various charts. The investigators found that the development and penetration of a metal-oxide constituent into the cast irons is intimately associated with high temperature deterioration. Improvement effected by chromium additions appears mainly to result from the ability of small amounts of chromium to inhibit and finally prevent penetration of the metal oxide constituent.

In discussing the subject of metal for glass forming molds the speaker stated that the prime requisite for the working surface is that it be polished highly and be free from imperfections. Up to the present cast iron has been used almost exclusively for this class of castings. The first part of the paper discussed the microstructures of mold castings and the causes of failure to function satisfactorily. The life of various molds varies to a considerable extent. An accelerated cracking test was devised to test the effect of the composition and treatment of the metal. The degree of cracking in the specimen after a given number of quenchings from 1100 degrees Fahr. indicated the relative resistance of the irons to heat checking.

Compare Strength with Structure

The paper "Cast Iron Strength vs. Structure," by Robert R. Adams pointed out that the following structural characteristics must be considered: Cell size, graphite characteristics, and matrix structure. The author proceeded with the comparison on the basis of tensile and transverse strengths with the structure of 176 specimens. From this investigation he concluded that tensile strengths correlate very well with structures, but is not entirely true with transverse strength. Brinell hardness does not correlate well with structure. Graphite size exerts an important influence on the strength properties of cast iron, as does cell structure. Through charts the speaker showed the general relationship between strength and structure in the irons studied.

"Effects of Ladle Inoculation on Austenitic Cast Iron," were described by J. T. Eash, International Nickel Co., Bayonne, N. J., at one of the technical sessions Friday under the chairmanship of Dr. J. T. MacKenzie, American Cast Iron Pipe Co., Birmingham, Ala. The speaker stated that transverse properties and tensile strength of 2.25 per cent carbon austenitic iron containing 14 per cent nickel, 6 per cent copper and 2 per cent chromium were improved to a marked extent by ladle additions of ferrosilicon. High carbon iron of similar alloy content was affected only moderately. Izod impact properties of all grades were improved by silicon inoculation. Improvement in properties was associated with a corresponding change in microstructure. Low properties existed in irons having a dendritic carbide and graphite arrangement. High quality material possessed a more random distribution of these constituents. Dendritism was most likely to form in low carbon irons and at the surface of all castings. Therefore naturally the elimination of this condition would improve the properties which are dependent upon a good structure in these locations.

Austenitic nickel-copper-chromium cast iron made from charges with high percentages of steel had superior mechanical properties and were improved to a greater extent by inoculation treatments than were castings made from cast iron scrap. In general, the speaker stated, mechanical properties of the inoculated test bars decreased as the carbon plus silicon increased. Austenitic nickel-copper-chromium cast iron possessed outstandingly high toughness and transverse ductility compared to pearlitic gray iron.

Promote Casting Growth

D. V. Ludwig, Capitol Foundry Corp., Astoria, Long Island, N. Y. presented an interesting paper on, "Production Hardening of Close Grain Cast Iron," based primarily on the salvaging of a large quantity of highly finished gray iron castings, rejected after they were machined slightly under size. The paper was unique in that while many papers have been presented over a period of years on methods to prevent the growth of cast iron, this paper described a method employed to promote growth so that the castings might be finished within specified dimensions. The treatment had to be varied to some extent for given quantities of castings, depending on the composition of the metal. The average treatment consisted in heating the castings to a temperature of 1550 degrees Fahr. followed by a draw and quench. Replying to a question from the floor the speaker stated that all scaling was prevented. Small test pieces were treated in sealed containers in an electric furnace in the laboratory. Commercial treatment of the castings, approximately 2 feet in length and 8 inches diameter, was accomplished in an oil fired furnace pro-

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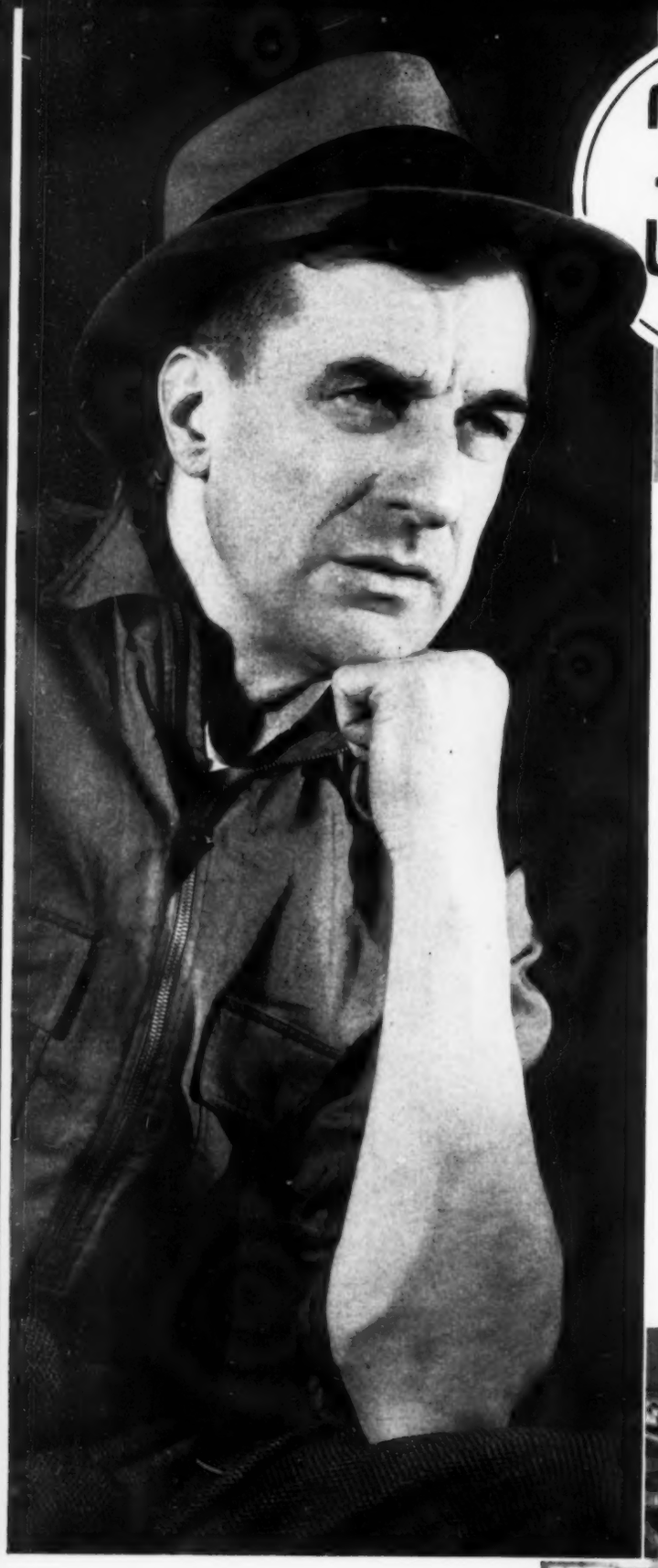

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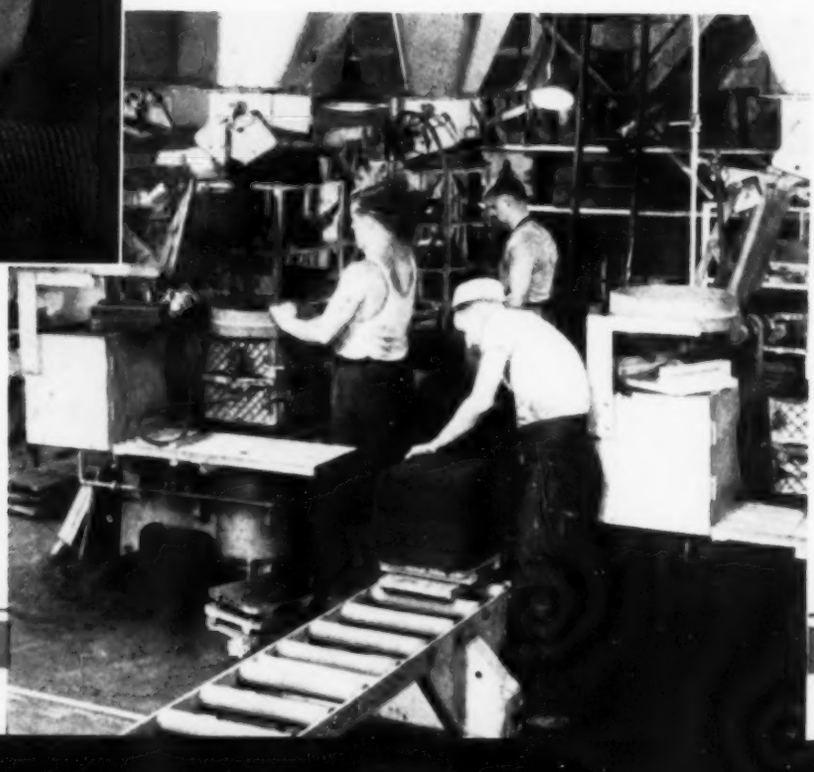

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(*Concluded from page* 143)

tected in a special manner from atmospheric contamination.

Dr. A. E. Schuh presided at the 2 p.m. gray iron session Friday where the following papers were presented: "Elastic Properties of Some Alloy Cast Irons" by A. I. Krynitski and C. M. Saeger Jr., National Bureau of Standards, Washington; "Statistical Methods as an Aid to the Control of Foundry Operation," by H. H. Fairfield, Canadian Department of Mines, Ottawa, Ont.; and "Phosphorus vs. Growth of Cast Iron," by Morris Cohen and M. N. Dastur, Massachusetts Institute of Technology, Cambridge, Mass.

In a comprehensive manner the first paper covered a series of tests where the transverse strength properties were determined on 1.2-inch diameter test bars made from three types of alloy iron heated before casting to maximum temperatures of 1400, 1500 1600 and 1700 degrees Cent., or 2550, 2730, 2910 and 3090 degrees Fahr. The test bars were bottom poured in groups of four in green sand molds set up in three part vertical flasks. Each flask contained two groups, or a total of 8 test bar castings. Total plastic and elastic deflection, modulus of rupture, relative moduli of elasticity, and total plastic and elastic resilience were determined and the microstructure of the test bars was examined. The speaker discussed comparative values of four different relative moduli of elasticity relating to the same test bars but calculated by different methods. He concluded by a comparison of transverse test properties of alloy and plain cast iron.

In the second paper the speaker presented a number of charts to illustrate the manner in which statistical data may be applied in the operation of a foundry. He directed attention to the fact that foundrymen all too frequently draw hasty conclusions from insufficient data. In many instances complete correlation of core properties, molding sand temperature and moisture content changed through spraying the surface, show that quite a few foundry conditions change according to the same cycle. No discussion of scrap causes can entirely disregard the personal element. Records of the same job with different operators soon will show that there is a great variation between the work of different individuals. The speaker demonstrated the relation between casting qualities and production variables. He emphasized this phase and claimed it is the ground work necessary before statistical quality control can be applied.

In the absence of the author the third paper was presented by title.

NONFERROUS CASTING

Problems Attract Close Attention

CAUSES of gas unsoundness, plaster molds and recommended practices for bronze castings were discussed in three papers at the 2:30 p.m., session Monday under the chairmanship of M. V. Healey, General Electric Co., Schenectady, N. Y., with D. Frank O'Connor as co-chairman.

H. L. Smith, Federated Metals division, American Smelting & Refining Co., Pittsburgh, in discussing causes of gas porosity in bronze castings presented a theory which has been supported to some extent by a few metallurgists and opposed to some extent by others. The theory is based on the effect of carbon, usually associated only with the smelting of ferrous metals, and regarded as a nonexistent factor in melting the nonferrous metals. According to the speaker a certain amount of carbon is developed in all melting operations either as carbon monoxide or carbon dioxide or a combination of both.

The carbon under the influence of high temperature breaks down the water vapor, unites with the oxygen and releases the hydrogen to unite with the metal and appear in the finished casting in the form of small or large cavities. Citing gas fuel as an example, he stated that every 1000 cubic feet of gas releases 11 gallons of water. A considerable part is evaporated in the furnace, but sufficient remains to account for the gas holes in the casting. The foregoing is only a brief synopsis. The entire paper, carrying a complete coverage of the subject, is worthy of close attention by nonferrous foundrymen.

Plaster molds for precision nonferrous castings were discussed by Henry Hagemeyer, Castings Patent Corp., Chicago. A large number of castings made by the process were presented by the speaker to show the efficacy of the process. The metal is poured into molds under pressures that vary from 2.5 to 4 pounds per square inch. In certain instances a hydrostatic pressure of only 1 pound per square inch is required. He claimed that the combination of a reasonably rigid mold and the liquid pressure is more than ample to reproduce the most minute detail. Replying to a question from the floor the speaker admitted that the cost of operation is slightly higher than the usual sand casting process, but the resulting castings are claimed so superior in every respect that the difference in cost is practically a nonexistent factor.

E. F. Hess, Ohio Injector Co., Wadsworth, O., presented the seventh of a series of recommended practices sponsored by the nonferrous division, American Foundrymen's Association. The general subject is covered in *The Cast Metals Handbook*, issued in 1940 by the association. The speaker pointed out that although the various practices are recommended by specialists in the various fields, they are not intended as specifications. The present report is limited to sand cast tin bronzes and covers fundamental metallurgy, general recommendations, properties and applications and a report of the nonferrous division committee on analysis of defects.

Two papers involving topics of peculiar interest under present conditions were given at the second nonferrous session on Tuesday morning under the chairmanship of W. J. Laird, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. The first paper was a joint work by Wayne Martin, Sperry Gyroscope Co., New York, and D. V. Ludwig, Capitol Foundry Corp., New York.

Use Secondary Aluminum

Mr. Martin's section of the paper involved the application of secondary aluminum in the nonferrous foundry and was the result of considerable research done on the secondary product now being used by Sperry because of the impossibility of obtaining virgin aluminum. When the company began to use the secondary product they found immediately it was impossible to segregate different aluminum alloys. All scrap was lumped into a single melt and the resulting metal contained a large number of alloying elements. The percentage ran approximately 2.5 per cent copper, the same amount of silicon, 0.5 per cent magnesium, 0.5 per cent zinc, and 0.90 per cent iron.

Specifications set up for good castings under the particular Sperry applications required that the metal must cast well, must machine well, and must be straightenable. Corrosion resistance of a high order was not necessary. The first castings made of the secondary alloy were unacceptable on all scores. After some research it was determined the magnesium was the difficulty, and elimination of this metal produced an alloy which gives tensile strengths from 17,000 to 18,000

(*Concluded on page* 148)

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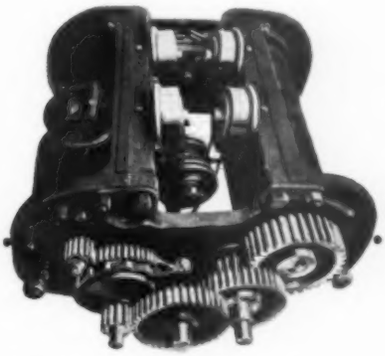

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(*Concluded from page* 146)

pounds per square inch. Some difficulty was encountered on heat treating this metal because of certain low melting point eutectic alloys which were present. For that reason heat treatment of five hours at 450 degrees Fahr. was found the best for all around performance.

Considerably more care must be used in foundry practice on the secondary metal because of the lower margin of safety. The company experienced considerable difficulty in subcontracting jobs involving secondary aluminum castings. However, an extensive instruction sheet for the subcontracting foundry was developed and these instructions were explained by representatives of the parent company.

Make Further Study

Section of the paper presented by Mr. Ludwig involved a number of tests run on virgin aluminum to investigate a reported difference between physical properties of heat-treated alloys when the heat treating furnace used gas as against electricity as a fuel. A hardness of 85 brinell was obtained by Mr. Ludwig on the electric furnace, while under identical conditions on a gas fired furnace the hardness was only 76 brinell. The speaker was at a loss to explain the difference inasmuch as his data had not been completed. He felt that the conclusions which could be drawn from the initial research were lacking in complete substantiation. Further reports will be forthcoming in the future on this section of the paper.

Discussion on these two presentations centered principally on the research done by Sperry on the melting practice and the heat treating practice on secondary alloys. Of considerable interest was the fact that a new group of naval specifications carrying the letter "A" after the initial number now covers secondary aluminum. It was announced at the session that the navy has approved the use of 4-A, which is the counterpart of 195 unheat-treated virgin aluminum alloy for unstressed parts in ship construction. Methods for eliminating the magnesium from the alloy also were questioned. The speakers were unable to indicate just what the best method was but it was assumed the smelters supplying secondary metal magnesium-free used chlorine compound to reduce the magnesium.

Widespread approval and considerable discussion marked the presentation of a paper by A. T. Ruppe, Bendix Products Division, Bendix Aviation Corp., South Bend, Ind., on the salvage of aluminum alloy castings by welding. Mr. Ruppe outlined the methods used by the Bendix company in salvaging aluminum alloy castings with small defects due not only to the foundry but to machine shop operations and careless handling. The foundry casts a welding rod of the same metal as the original casting and these rods in the hands of the best welders available are used to eliminate small flaws. Production figures show that approximately 5 per cent of the castings being turned out by the company include some welding. These castings otherwise would have had to be scrapped.

Castings to be salvaged are heat treated before and after welding, and a standard commercial flux is used. Tensile tests made on welds in the form of standard test bars which have been fractured and welded show equivalent or better tensiles than as-cast test bars. Difficult welding problems have been found on the heat treated alloys, and generally speaking the unheat-treated alloys proved better subjects for this operation.

A jury of three inspectors is required to pass on each casting before it is returned for welding in order to determine whether or not it is suitable for salvage. This routine must be followed inasmuch as there are certain types of work which cannot be salvaged due to service factors, and due also to the fact that most of these castings are used in aircraft construction and therefore must withstand considerably more severe tests than the average casting.

Intense interest of nonferrous foundrymen in problems of the industry was indicated by the large attendance at the roundtable luncheon and conference which was held Tuesday noon at Hotel Statler. Nearly 300 foundrymen were present, and that is believed to be the largest gathering to date. B. A. Miller, Cramp Brass & Iron Foundries division, Baldwin Locomotive Works, Philadelphia, was chairman, and C. O. Thieme, H. Kramer & Co., Chicago, was vice chairman. Topics discussed at the conference included "Some Causes of Porosity in Silicon Bronze Castings," by J. E. Crown, U. S. Naval Gun Factory, Washington, and "Some Causes of Porosity in Navy 'G' and 'M' Metals," by W. B. George, R. Lavin & Sons, Chicago.

Approximately 100 foundrymen attended a session on aluminum castings production for war work. B. D. Claffey, General Malleable Corp., Waukesha, Wis., presided, and was assisted by Martin Qualantone, Wright Aeronautical Corp., Paterson, N. J., and Frederick Ayres II, Aluminum and Magnesium Branch, War Production Board, Washington. Mr. Ayres pointed out that the government was extremely interested in obtaining as many aluminum castings as possible, and suggested that those foundries not now engaged in war production, send information on capacities, types of work that can be handled, etc., to his department at Washington. Capt. Brown, Wright Field, Dayton, O., discussed magnesium alloy castings for aircraft.

CONSIDER GRAPHITIZATION Of Malleable Iron

FACTORS involved in mechanizing the malleable foundry were outlined by D. F. Sawtelle, Malleable Iron Fittings Co., Brantford, Conn., at the opening malleable session on Monday. Sand flow diagrams and the problems of handling sand and controlling sand content under a completely mechanized system constituted the principal points involved in Mr. Sawtelle's paper.

The loop system of layout was used in this shop, with "trains" carrying the flasks from first position on the molding floor through the pouring station, then to a cooling cycle and eventually to a shakeout. Following the shakeout, the conveyor line divides, carrying the castings to a sprueing station and the sand to the mullers for re-use.

Because this system introduces core sands into the molding sand, there was some discussion regarding the eventual makeup of the molding sand. Some comment pointed toward an eventual identical composition in both core room and on the floor. Chief part of the discussion centered on the recovery of necessary fines, which were eliminated from the system by the dust collection system operating at a high vacuum.

The second paper in this session, which was presided over by C. F. Joseph, Saginaw Malleable Iron division, General Motors Corp., was given by Charles Arnold of that firm. This paper, on "Gating Malleable and Armasteel Castings", was written by Fred Reeves. also of Saginaw, and was principally an extensive demonstration of the company's gating practice. The paper presented a large number of case histories, showing where problems of various types occurred and

(*Continued on page* 151)

THERE WAS MUCH OF INTEREST AT THE AJAX EXHIBIT!

1 INGOT METAL
NONFERROUS . . .
CASTINGS IN THE WAR EFFORT

How Ajax nonferrous ingot metals of today enter into castings for the war and victory effort were seen at the Ajax exhibit . . . together with specimens of the Ajax ingot metals and alloys from which the castings were made. Items of especial interest to all foundry personnel were selected. If you did not see them, write us for "Nonferrous Ingot Metals of Today" booklet.

2 A NEW KIND OF EXHIBIT ON FOUNDRY PRACTICE
APPRENTICES & SUPERVISORS NOTE:

Interest today centers around the control of each step in casting so that defects may be evaluated and corrected unfailingly. To this high and worthy goal of foundrymen in the nonferrous field, Ajax contributed "exhibit castings" in which difficulties were first isolated and then overcome, in line with expert practice and observations found in the Manual of The Nonferrous Ingot Metal Institute, Section 6. Use your Manual more often!

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A copper-silicon-zinc alloy of the useful and versatile 'Tombasil' family has been developed for the tinless trend in bronze. Known as Ajax 'Navy' Tombasil, it possesses physical properties far in excess of either Government G Bronze (88-10-2 . . . 88-8-4) Specification 46M6G; or "M" Metal Specification 46B8G; as well as the physical values stipulated in Navy Specification covering Copper-silicon Alloy known as Specification 46B28. Castings made from it were shown and discussed. Write for information, and for Bulletin 115.

4 MELTING
INDUCTION FURNACES
FERROUS & NONFERROUS

The widely used high-frequency (Ajax-Northrup) and low-frequency (Ajax-Wyatt) electric melting furnaces have revolutionized melting practice in the ferrous and nonferrous fields. Each operates on a unique induction principle which is graphically illustrated at the Ajax Booth. Those interested in melting high-grade steel alloys and the nonferrous metals should study these furnaces.

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Young America needed rugged individuals to guide her destiny. Andrew Jackson did his job well. Today JISCO Silvery is doing its job well in foundries throughout the land.
OLD HICKORY
"JISCO"
HIGH SILICON IRON

THE JACKSON IRON & STEEL Company

JACKSON, OHIO.

(*Continued from page* 148)
how they were eliminated by varying the gating practice.

Shrinkage, which is a prevalent defect, was in some cases eliminated by gating into the shrink. Other cases were eliminated through the use of chills. Hot cracks were usually traceable to insufficient gating, and more adequate practice usually cleared up the difficulty. Better control of runners eliminated a considerable proportion of misruns, while other causes were too high a proportion of seacoal, improper gating and cold metal.

Discussion on this paper centered around a discussion of carbon content and its effect on shrinkage. Opinion was well divided on this subject, as usual, but most of those present seemed to lean toward higher carbon, claiming that above 2.50 there is less tendency to shrink.

The final paper in this session was a study of the effects of copper additions and varying rates of heating and cooling on the graphitization of iron. It was a short resume of a long paper written by C. H. Lorig and A. R. Elsea, Battelle Memorial Institute, Columbus, O., and presented by Dr. Lorig.

White cast iron test bars were used as the basis for this study, containing copper 0.032, 0.60, 1.22, 1.62, and 2.48. One batch containing a bar of each analysis was given a pre-treatment by holding it at 600 degrees Fahr. for 8 hours before running the test. Two heating cycles were used, the first reaching peak temperature in 40 minutes, the second reaching 1000 degrees Fahr. in one hour, and peak in six hours. Two peak temperatures, 1600 and 1700 degrees Fahr. were used.

Check Graphitization

Graphitization was checked and treatment continued until no cementite remained. Time of graphitization dropped with the increase in copper content. The specimens receiving the pre-treatment also showed a decrease in the time of graphitization, while the slower heating cycle brought similar results. All specimens were cooled under close control at a rate between 10 and 11 degrees Fahr. per hour and then tested for residual pearlite. The higher copper content again showed less pearlite, the amount varying inversely with the amount of copper.

At the malleable session Tuesday morning, Dr. Harry A. Schwartz, National Malleable & Steel Castings Co., Cleveland, in speaking on "Principles of Graphitization", pointed out that the graphitizing rate may depend upon the amount of graphite in the melting furnace charge, or when it was introduced. If graphite-bearing materials are added to liquid iron shortly before pouring, he stated, annealing is facilitated.

In abstracting a paper on "Some Effects of Hydrogen on the Time of Malleablization", by C. H. Lorig and M. L. Samuels, Battelle Memorial Institute, Columbus, O., Mr. Lorig mentioned that white cast iron, especially in the quick-malleable range of compositions, responds to both first and second stage malleablization at a much faster rate after having been given a pretreatment at about 600 degrees Fahr.

The speaker found that melts supersaturated with hydrogen respond better to this pretreatment than ordinary heats. The presence of a larger number of temper carbon nodules in the pretreated irons, he explained, produces faster malleablization than occurs in those annealed directly in the as-cast condition. Evidently, he stated, the smaller temper carbon nodules originate from a nucleization effect of the low temperature pretreatment. While nucleization is associated with the escape of hydrogen, he explained, the exact mechanism still is unknown but experimental work is in progress.

Sorting Speed Varies

G. H. Junge, National Malleable & Steel Castings Co., Cleveland, in discussing the "Suppression of Graphitization by Supercooling", mentioned that when liquid iron starts to freeze it desires to become solid iron and graphite. It is accomplished by a sorting-out process, he explained, on an atomic scale similar to sorting out a deck of cards into a pile of red and a pile of black. The speed of sorting is faster the higher the temperature. If the alloy, by faster cooling is not allowed sufficient time at high enough temperature for the carbon and iron atoms to be sorted out, no solid material will form, he stated, and the temperature of the liquid will decrease with an attendant decrease in atomic mobility.

Cast irons when given sufficient opportunities of time and temperature during cooling, will freeze as gray iron. However, the speaker contended, when they freeze as mottled or white iron, the reason is to be found in the lack of opportunity to do otherwise under the time-temperature conditions prevailing during the cooling. He mentioned that cast iron is susceptible to undercooling and that white iron can be produced in a normally gray iron when, by rapid cooling, this supercooling becomes about 200 degrees Fahr. In conclusion he drew attention to the importance of supercooling in the production of white irons of malleable composition pointing out that gray iron results when supercooling is absent.

W. D. McMillan, McCormick Works, International Harvester Co., Chicago, in speaking on "The Effect of Composition on the Annealing of White Cast Iron", drew attention to the fact that the first stage of graphitization may be completed in a much shorter time with a high silicon iron of 1.60 per cent than with a 1.00 per cent silicon iron. Test data were cited to show that the number of graphite nodules is greater in the higher silicon irons and that with continued heating at the same temperature the number of graphite nodules decreases.

R. J. Cowan, Surface Combustion Co., Toledo, O., in presenting a paper on "Atmospheres and the Annealing of Malleable Iron", warned that malleable iron manufacturers must guard against primary graphite in the original hard iron to prevent its formation during annealing, thereby producing a hybrid form of cast iron rather than of malleable. The speaker recommended an annealing cycle that made use of a temperature cycle which insures the absence of combined carbon in the matrix of the metal.

Decarburization during the first part of the annealing cycle is a thing to be avoided as much as possible, the speaker said, because it always serves to extend the overall annealing time, and in direct relation to its extent. This is a clue to the reason why a radical change of packing material always will affect the annealing cycle unless this cycle be prolonged unduly.

Five papers were presented at the Tuesday afternoon malleable iron symposium on graphitization conducted by Dr. Harry A. Schwarz, National Malleable & Steel Castings Co., Cleveland, and Carl Joseph, Saginaw Malleable Iron Division General Motors Corp., Saginaw, Mich.

A paper prepared by W. R. Bean and W. R. Jaeschke, Whiting Corp., Harvey, Ill., and dealing with intermittent annealing furnaces, was presented by Mr. Jaeschke who stated that a survey showed that 71 per cent of all malleable iron castings in this country still are annealed in this type furnace. The period ranges from 7 to 10 days. However, in recent years 41 per cent of the furnaces have been either built or converted to powdered coal fired units and have been insulated in walls, roof and hearth with resulting improvement in time and product. He described methods and equipment both for cupola and air furnace malleable, pot and open annealing in car type and open floor furnaces.

Several interesting features of electric furnace annealing were presented by R. M. Cherry, General Electric Co. He discussed two general types of furnaces, continuous and batch types. For the continu-

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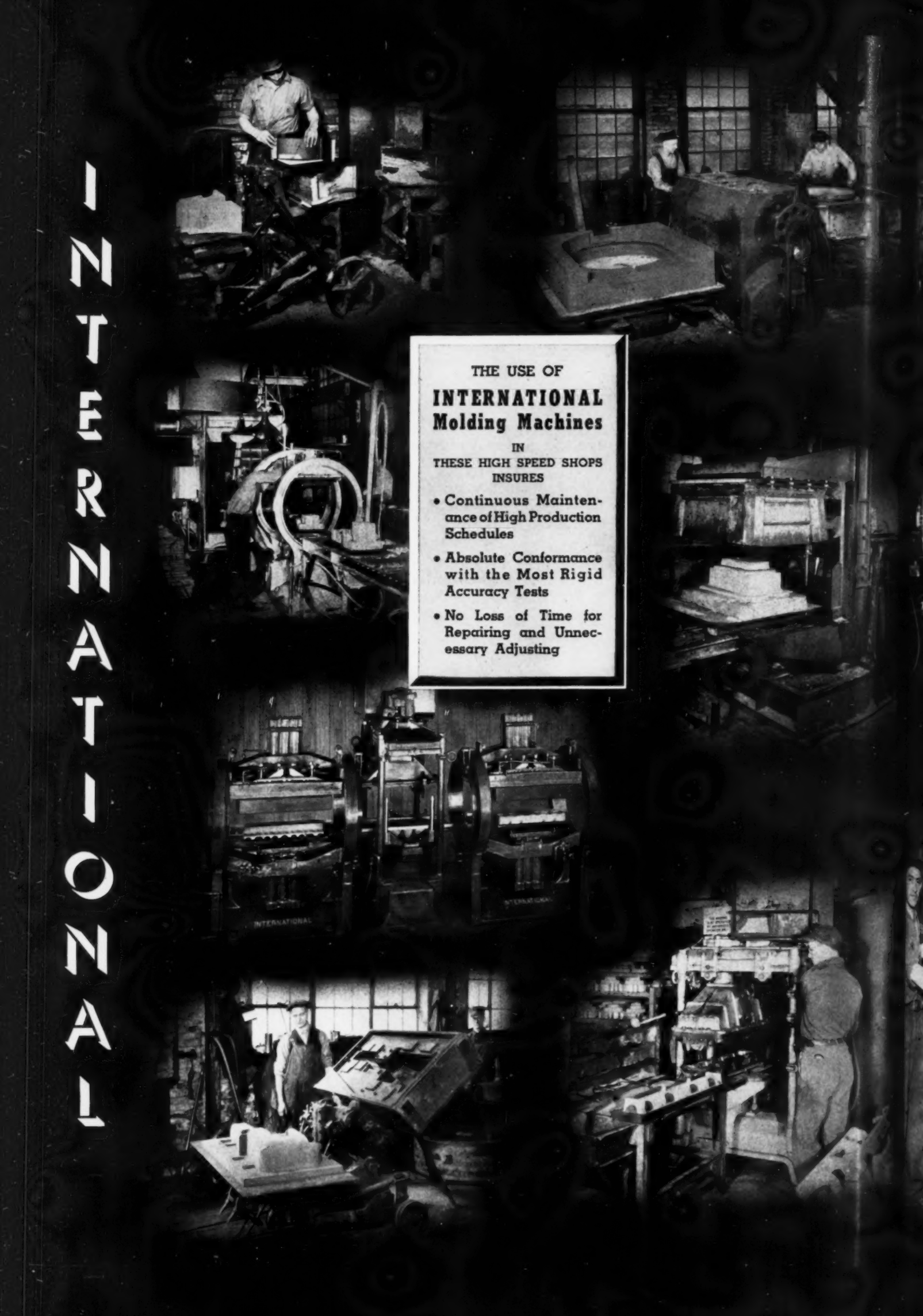
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(*Concluded from page* 151)

ous type he outlined the construction, operation, advantages and disadvantages of the roller hearth and pusher type tray type furnaces. He also gave the same information on a continuous type furnace, part of which is heated by gas and the remainder by electricity. Under batch type furnaces he discussed in detail the elevator type and presented illustrations of various installations. He closed his paper with a discussion of some of the advantages of electric malleable annealing furnaces.

Tunnel Kiln Annealing was the title of the paper presented by R. J. Anderson, Belle City Malleable Iron Co., Racine, Wis. The speaker went into considerable detail on the operation, advantages and disadvantages of the tunnel kiln annealing furnace for malleable iron. He outlined specifically the experience of the Belle City Malleable Iron Co., in operating this type of furnace. Other related features covered in detail included choice of packing material, construction of the kiln, methods of increasing or decreasing capacity, advantages and disadvantages of the tunnel type kiln and methods of overcoming disadvantages. He described work done on his company's tunnel kiln to increase efficiency during periods of slack operation. He also outlined the effect of redesign of the kiln on temperature control, how to vary the annealing cycle under the conditions outlined and finally the cost of operation.

James H. Lansing, Malleable Founders' Society, Cleveland, described temperature control of graphitizing furnaces. The first part of the paper dealt with early attempts to control temperatures and the reliance placed on the operator for securing a well annealed product. He then discussed the use of thermocouples; millivoltmeter and potentiometer pyrometers, indicating and recorder type. He suggested additional methods of checking temperatures in malleable annealing furnaces. Emphasis was placed on the temperature lag between the furnace temperature and the actual temperature of the castings in the pots.

Duncan P. Forbes, Gunite Foundries Corp., Rockford, Ill., in a paper titled "Graphitization of Arrested Anneal Malleable Iron", stated two processes are used commercially. In the first the anneal is completed with the retained combined carbon by a suitable time-temperature cycle. The second method follows a procedure of completely annealing the castings so that practically no combined carbon remains in the matrix, and then reheating the castings to a predetermined temperature so that the temper carbon goes back into solution in the matrix.

DEFENSE AND PROTECTION

Of Plants Are Essential

REAR ADMIRAL C. H. WOODWARD, assistant director OCD, Washington, presented an extremely interesting address at a meeting on plant defense and protection held Wednesday afternoon. He said that many in this section of the country were as yet not fully cognizant of the fact that we have been in a total war for the past 4½ months which he believed due to preachings of the isolationists. However, it was necessary for every citizen to exert all effort to defeat the axis powers, and all must share in the sacrifices. While this country has a vast reservoir of manpower and machines it takes time to put it to the most effective use. However, time is short and every effort must be exerted to get into production now.

This country must go on a real war time basis as soon as possible or we will lose the war. One plane or machine today is worth 10 six months from now. Notwithstanding enemy successes, we can win by getting into production immediately. To keep production going, it is necessary to have plants guarded against bombing, fires, etc., and that applies to all plants whether engaged in production of war materiel or not. This Middlewest can be raided by air since the distance from Brest, France to Cleveland is only 3400 miles; to Detroit, 3600 miles and to Chicago 3900 miles. He said it was quite possible for an aircraft carrier to arrive undetected from 800 to 1000 miles off New York, launch planes, and have most of them return. With the ruthless tactics employed by the enemy, we must be prepared, and there was little time to do that.

Plant protection falls directly on management and it must see that the work begins at the top and carries on down to the employe. Proper detailed organization is a necessity, and numerous drills on various phases of protection are extremely valuable. Total war depends on helplessness and confusion, and every play must be won otherwise we never may get the cards back in our hands again.

James R. Allan, International Harvester Co., Chicago, and chairman of the A.F.A. committee on plant protection during war time, gave a brief report on the recently issued code relating to that subject. He pointed out that the code was based on adequacy of doing the job, cost of doing it, and time required to do it. The code gave information on protecting the foundry against sabotage, bomb raids and blackout preparations.

One of the first recommendations is an investigation of plant personnel to see that they are trustworthy. They should have identification means such as badges for entering the plant to work. Visitors should be identified also and be accompanied by guides. Never take any person at face value, make him show credentials.

One man should be in charge of all plant protections with as many assistants as necessary. His office should be in the safest area of the plant, and he should have direct communication with all vital points within the plant. All trucks and railroad cars, etc. should be opened immediately for inspection before entering plant confines. Employes should be trained to question unidentified persons seen in the plant. The report describes window protection and numerous other features. An effective blackout means for cupolas is use of pieces of tar which are thrown in the charging door. That material emits a large volume of dense black smoke which effectively eliminates glare.

Following Mr. Allan's review Commander Singer, U. S. Navy, answered a number of questions one of which related to incendiary bombs. He said that water seemed to be the most effective extinguisher since it prevented spread of the fire and controlled it. Sand could be used, but on a wood floor it was necessary to get some under the bomb since it burns downward. Salt and soap also could be used. Trick compounds should be avoided. Coal tar pitch is effective with magnesium shavings but does not work well with solid magnesium.

He stated that it was advisable to investigate carefully all prospective employes. Finger prints made in duplicate and sent to the local police and to Washington would be of great help in eliminating undesirable characters. In response to a question on types of incendiary bombs used, Commander Singer stated that they included phosphorus, magnesium, thermite and oil, and that the latter two caused very serious fires. He also mentioned that for plant protection it was possible to obtain a shorter than the regular first aid and fire warden courses by consultation with the local OCD offices.

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MCA

MOLYBDENUM CORPORATION OF AMERICA
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foundry activities

OHIO STEEL FOUNDRY CO., Lima, O., has built a new building incorporating new features in ventilation. Large, sliding roof vents, motor-driven and traveling on standard railroad rails, remain open in summer while the plant is in operation, thus providing ventilation and light. In winter, ventilation will be supplied by large fans, mounted directly in the center of the vent. The building will house a series of electric furnaces. The structure will be connected to the plant's new personnel building to be built shortly. The company's expansion program also includes the building of an addition to its existing foundry building. Albert Kahn Associated Architects and Engineers, Inc. Detroit, designed the new building.

* * *

Wallaceburg Brass Ltd., Wallace street, Wallaceburg, Ont., is planning an addition to its plant.

* * *

Akron Brass Mfg. Co., Wooster, O., is making alterations for a core room.

* * *

West Point Foundry & Machine Co., West Point, Ga., has let contract for an addition to its building.

* * *

Wilson Foundry & Machine Co., Pontiac, Mich., is planning alterations to its plant.

* * *

Atlantic Foundry Co., 182 Beaver avenue, Akron, O., is enlarging its plant.

* * *

Belle City Malleable Iron Co., Racine, Wis., has let general contract for an addition.

* * *

Philbrick-Booth & Spencer Inc., Hartford, Conn., will build a factory addition.

* * *

J. Rubens is building an addition to his foundry at 4550 Cutter street, Los Angeles.

* * *

Moffat's Ltd., 23 Denison avenue, Weston, Ont., is taking bids for a one-story plant addition.

* * *

Jonson Foundry & Machine Co., formerly the Jonson Engineering Co., has purchased a foundry at Myerstown, Pa. The plant comprises a gray iron foundry, machine shop and pattern shop. E. H. Jonson is proprietor.

* * *

DeHavilland Aircraft of Canada Ltd., Dufferin street, Toronto, Ont., has let general contract for a foundry building.

* * *

Rogers Pattern & Foundry Co., 938 East Sixtieth street, Los Angeles, is erecting an addition to its building.

* * *

Thomas Foundries Inc., 3800 Tenth avenue North, Birmingham, Ala., is planning the erection of a foundry building.

* * *

Walworth Co., Greensboro, Pa., is building a steel foundry in the St. Louis district which will be in operation shortly.

* * *

Dominion Foundries & Steel Ltd., Depew street, Hamilton, Ont., is having plans prepared for further addition to its plant.

* * *

Farrel-Birmingham Co., Ansonia, Conn., has awarded general contract for construction of its new plant in northern New York to the Turner Construction Co.

* * *

Variety Iron Foundry Co., 1245 Utah avenue, Seattle, is adding to its plant at Second avenue South and Spokane. Contract has been let to Berg & Patterson.

* * *

Sterling Foundry Co., Wellington, O., is undertaking an expansion program to increase its output of gray iron castings. Austin Co., Cleveland, is contractor.

* * *

Lindeman Power & Equipment Co., Yakima, Wash., is building a steel foundry addition to its plant at 1011 South Third street and modern equipment will be installed.

* * *

Worthington Pump & Machinery Corp., Harrison, N. J., has let contract for design and construction of storage building, foundry addition, and service building.

* * *

Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., has awarded a contract to the Turner Construction Co., Philadelphia, for the erection of a large new structure.

* * *

Al-Bra Foundry Co., 5865 Wilmington avenue, Los Angeles, is the firm name under which Warren K. Clapp has obtained a certificate to conduct business.

* * *

Building permit has been issued to Ensign Carburetor Co., 7010 South Alameda street, Huntington Park, Calif., for construction of a foundry building.

* * *

Weir Machine & Foundry Co. Inc., Plano, Ill., has been incorporated by F. Weir, A. Sampson, and J. B. Arterburn Sr., to manufacture metal products.

* * *

A. L. Brennecke, W. C. Dunkerton and G. J. Rummels, Marshalltown, Iowa, will build two 82 x 200-foot foundry buildings estimated to cost $40,000.

* * *

Electrocast Steel Foundry Co., 4701 West Fifteenth place, Cicero, Ill., is making an addition to its plant to facilitate its production of cast steel products.

* * *

United Brass & Aluminum Co., 3127 Goulden street, Port Huron, Mich., has awarded contract to Ketels & Feil, Port Huron, for construction of foundry.

* * *

Symington Gould Corp., Rochester, N. Y., is starting an expansion program at its Depew, N. Y. plant. Armor plate castings for tanks will be made at the new unit.

* * *

Farrell-Cheek Steel Co., 1320 First street, Sandusky, O., will double production of castings. A new main building will be erected and other buildings and furnaces will be added to meet the larger production quota. Herbert Farrell is president.

* * *

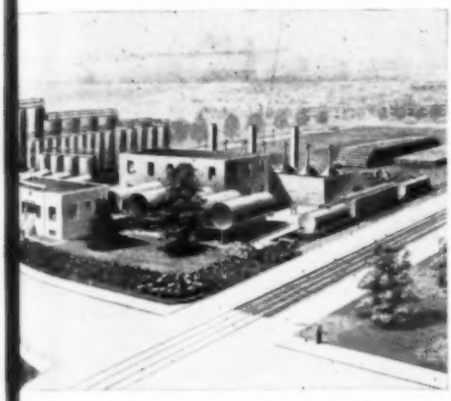
Department of Munitions and Supply, Ottawa, H. H. Turnbull, secretary, has given general contract to Anglin-Norcross, Quebec Ltd., 892 Sherbrooke street, West Montreal, for addition to foundry at Quebec, Que.

The CORE OIL DOCTOR

Devoted to new ideas and case study reports on core room practice

Published Monthly, Volume 1, Number 2, May 1942

Now, more than ever before, you need "exact to specification" core oils. *Production for war must daily increase—discount must be eliminated!* How can you better assure yourself of just the right core oil for each different type of job than to have our experienced chemists in this new, modern plant analyze your needs? Their recommendations, based on years of field experience and thousands of satisfied customers, assure you of worthwhile core room economies.



A birdseye view of our new 350,000 gallon capacity plant. Equipped with six large, high speed kettles, modern weighing, pumping and filling equipment—all under constant laboratory control.

Planned to better serve you, our facilities are unexcelled. High speed kettles, 350,000 gallons storage capacity, modern weighing, pumping and filling equipment and all operations under expert laboratory technicians.

Questions and Answers

Question: How can core ovens be inexpensively improved to more evenly bake large and small cores?

Answer: Old type coke-fired ovens with one chimney in the top center can be greatly improved at little cost by making the following changes.

Close present chimney entirely and, depending upon oven capacity, install a 10 to 18" pipe in each corner of the oven 12" from the floor and running up to the ceiling. All four pipes should be then joined together at ceiling level so that there is only one outlet from the oven to the outside and a damper should be inserted in this outlet. The heat in the oven is then made to rise to the top and eventually move down to the level of the pipe outlets in each corner 12" above the oven floor, assuring a more even distribution of heat over the entire oven area. Proper manipulation of the damper will enable you to bake cores much quicker by first opening it wide until all initial moisture is cleared and then closing it about three-quarters so as to hold in the dry heat.

Oven heat can be inexpensively circulated by installing a coke fire on each side of the oven door and arranging two 18 to 24" fans so that the blades are above each fire inside the oven and the motors on the outside. A long shaft going through the wall connecting blades with motors is all that is necessary.

Without obligation, we will be glad to furnish simple change-over particulars to any foundry submitting a sketch of their present old type core ovens.

If you have developed a special core room technique, let us tell the industry about it. Send us details for inclusion in this column.

An intricate, deep cavity core for an airplane part made with Certified "Dependable" Core Oil.

Let us help you with your core oil problems. Send us samples of the core oil you now use so that we may test it, or describe fully the kind of castings you produce, the kind of metal, the type of sand you use and whether you prefer a golden or dark-colored core oil. We will send you a report of our findings and are sure that any time and trouble you might spend furnishing us this information will be many times repaid. By your purchases of Certified Core Oil you will secure a reduction of smoke and gas when the metal is poured, a smoother working core oil, a reduction in core making costs and, more importantly, a thoroughly dependable second source of supply.

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activities of foundry groups

Quad-City

APRIL meeting of the Quad-City Chapter of the A.F.A., was held at the Fort Armstrong Hotel, Rock Island, Ill., Monday, April 13 with 40 present for the dinner and 50 for the technical session. A. H. Putnam, A. H. Putnam Co., Rock Island, and chairman of the chapter presided. Visitors and several new members were presented.

Report of the nominating committee was made by C. F. Burgston for Hy Bornstein chairman. Nominations for officers were: Chairman, A. D. Matheson, French & Hecht Inc., Davenport, Iowa; vice chairman, W. E. Jones, Bettendorf Co., Bettendorf, Iowa; and secretary-treasurer, J. Morgan Johnson. Nominated to the board of directors to serve 3 years were: P. T. Bancroft, R. H. Swartz and Jack Swatek; A. H. Putnam was nominated to serve the unexpired term of W. E. Jones. John Ploehn was appointed chairman of the picnic committee.

R. G. McElwee, Vanadium Corp. of America, Detroit, was the main speaker for the session, and he spoke on: "Alloy and Treated Cast Irons." Mr. McElwee spoke on the conditions of the gray iron industry with regard to the research necessary to compete with other materials. Cast iron fits into many places, but lack of development in the industry has retarded its advance. He pointed out that to assure consistent production of good castings, research is necessary.

The next meeting of the chapter will be at the Blackhawk Hotel, Davenport, Iowa on May 18.—*J. Morgan Johnson, secretary-treasurer.*

Chesapeake

MONTHLY meeting of Chesapeake Chapter of the A.F.A., was held at the Engineers Club, Baltimore, March 27. E. A. St. John, technical advisor of Federated Metals Division, American Smelting & Refining Co., as the principal speaker. Mr. St. John discussed thoroughly the substitution of silicon bronze and aluminum bronze for tin bronzes. Silicon and aluminum bronzes now are being used extensively throughout the country owing to the prevailing scarcity of tin as well as aluminum and copper. Various applications of the alloys were discussed and everybody present benefited. While the meeting was strictly nonferrous, the gray iron and steel foundrymen present joined in the discussion.

Edro Richardson

One of the outstanding events of the evening was a visit to the chapter by Edro Richardson, one of Baltimore's oldest foundrymen. Mr. Richardson started in the foundry business as an apprentice at the age of 11 years with the Maryland Brass & Metal Works in the spring of 1886. He continued with the company until 1897. During that time and at the ripe old age of 17, he was appointed foreman of the shop. On Jan. 11, 1897, he started in business for himself, originating the Edro Richardson Brass Co., where he continued until the Baltimore fire in 1904. At that time he moved his business next door and operated there until 1923, when he purchased a large building and operated a foundry and brass fitting shop until 1938. Due to the depression, Mr. Richardson was forced to close his modern foundry which he had established. However, after several months, he started again in business and has been actively engaged in brass specialty work. As a reminiscence of old times, Mr. Richardson

(*Continued on page* 160)

Members and guests present at the March meeting of the Chesapeake Chapter of the A.F.A. (Upper left) C. M. Holcolm, sales engineer, Foundry Equipment Co., Cleveland. (Upper center) John H. Cochran, Cochrane Brass Foundry, York, Pa. (Upper right) Left to right, William Mannion, U. S. Coast Guard Depot, Curtis Bay, Md., Jean Reyer, sales representative, James J. Lacy Co., Baltimore, Md., and Fred Roemer, foundry foreman, Balmar Corp., Woodberry, Md. (Lower left) Left to right, Charles Burgee, Western Electric Co., Point Breeeze Works, Baltimore, and Bertram Reed, sales representative, Whitehead Bros. Co., New York. (Lower center) Left to right, C. W. Thompson, sales representative, New Jersey Silica Sand Co., Millville, N. J., J. B. Mentzer, superintendent, Wood Embly Brass Co., Waynesboro, Pa., J. Milson Graham, sales representative, Ajax Metal Co., Philadelphia. (Lower right), speaker at the meeting, E. A. St. John, technical adviser, Federated Metals Division, American Smelting & Refining Co., New York. Photos courtesy of Frederick Bruggman, Gibson & Kirk Co., Baltimore

STERLING GRINDING WHEELS *HAVE ALL THE FEATURES to Snap Up Foundry Production*

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Every foundry grinding job calls for special wheels. Snagging heavy sprues and gates from thin section castings naturally calls for a different type wheel than, for example, does ingot grinding.

Using the correct Sterling Grinding Wheel for every job is not only good business, it is vital during these days of wartime demands for faster production. Don't create a "slow-down" on your grinding jobs by using the wrong wheel! Sterling engineers are available to work with you to determine the type of wheel you need.

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THE STERLING GRINDING WHEEL DIVISION
OF THE CLEVELAND QUARRIES COMPANY
TIFFIN, OHIO

THE WHEELS OF INDUSTRY

(*Continued from page* 158)

presented to Chapter Chairman, E. W. Horlebein, a badge that was given to him as a member attending a banquet held at the Old Lexington Hotel by the Baltimore Brass Foundrymen's Association in 1906. Mr. Richardson explained that at the turn of the century, tariffs were much in evidence and copper, lead, and zinc prices went sky high. The Baltimore Foundrymen's Association was organized to try to establish selling prices among local foundrymen. The association continued for about 4 years, holding meetings once a month, and a banquet once a year.

Certainly during these long years of service, the foundry industry of Baltimore has marked Mr. Richardson as an outstanding personality. His picture, taken in front of his present establishment is evidence that he is still able to continue to supply the requirements of valves and fittings and special machine work to the various industries in Baltimore. Chesapeake Chapter wishes him good luck and good health for many years to come, and bids him welcome to its future meetings.

Chairman Horlebein appointed a nominating committee as follows: Walter W. Levi(Lynchburg Foundry Co., Lynchburg, Va., chairman; Bernard F. Crane Kennedy Foundry Co., Baltimore; Fred Roemer, Balmar Corp., Woodberry, Baltimore; Donald F. Lane, Bethlehem Steel Corp., Sparrows Point, Md.; J. S. Young, U. S. Navy Yard, Washington. The committee will select nominees to be elected to the various offices of the chapter for the coming year.—*Frederick Bruggman.*

Detroit

SPACIOUS and luxious quarters of the Engineering Society of Detroit in the new $2,000,000 Horace H. Rackham Educational Memorial Building drew the admiration of the 75 persons attending the March 19 meeting of the Detroit Chapter of the A. F. A. there. The chapter is reported to be eligible to hold regular meetings at the Memorial building.

Robert E. Kennedy, secretary of the A. F. A. from Chicago, was guest and spoke briefly of the convention in Cleveland, and also commended several Detroit chapter members for their assistance in arranging the details of the convention.

Frank G. Steinebach, editor, THE FOUNDRY gave a short coffee talk following the dinner, and drew on his experiences in Washington as head of the foundry equipment branch of the OPM. He called attention to the fact that the military services are not yet casting minded and urged all members to concentrate on winning the war forgetting for the moment any postwar problems. He also urged foundrymen to steer clear of Washington in the solution of their problems and to work more closely with field offices of the contract distribution services, and with leading prime contractors.

Frank J. Dost, superintendent the Sterling Foundry Co., Wellington, O., presented the feature address in the Engineers Auditorium of the Rackham building. He described practices in his plant, and stressed the fact that the machine tool castings produced there are accepted or rejected on the basis of metallographic examination, instead of on chemical analysis of physical properties.

Members of the Detroit Chapter met in the new Horace H. Rackham Educational Memorial building on March 19. Frank J. Dost, Sterling Foundry Co., Wellington, O., was the main speaker

One of the liveliest meetings of the year was held by the Detroit Chapter on April 16 at the Horace H. Rackham Educational Memorial, the speaker being A. W. Gregg, Whiting Corp., Harvey, Ill., who spoke on converter steel production in foundries, with special reference to the triplex process involving cupola, converter and acid-lined electric furnace. About 100 were on hand for the meeting.

Mr. Gregg pointed out that army specifications had been relaxed in recent weeks to give steel made by the triplex process "a clean bill of health" after an earlier limitation on that type of steel, because of its supposed poor shock-resisting qualities at low temperature. Dephosphorizing by the Yocum process was outlined, Mr. Gregg pointing out that it is not practical to handle heats smaller than 5 tons, because of the temperature loss.

Discussion following Mr. Gregg's presentation centered around the function of the electric furnace in the triplex process. It was the general opinion that this unit was little more than a holding furnace, and served to impart no extra qualities to the converter steel. Mr. Gregg cited the interesting case of one steel plant which was able to buy 300 tons of scrap turnings a day. To use them the plant installed three

(*Continued on page* 162)

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(*Continued from page* 160)

briquetting presses and charged 70 per cent briquets into a cupola, after which metal was processed in converters and finally in basic electrics. The system permitted a 100 per cent increase in output over former practice and boosted rolling schedules from 22,000 to 40,000 tons a month.

S. Wells Utley, president, Detroit Steel Casting Co., reviewed his company's experiences with bessemer converters, dating back to 1888. They were operated from that time to 1927, when they were discontinued because of the general preference of buyers for "electric" steel.—*A. H. Allen, secretary.*

Pittsburgh

RECENT developments in cupola practice were outlined for the Pittsburgh Foundrymen's Association by R. C. Good, Electro Metallurgical Co., Pittsburgh at the association's March meeting. Factors to be considered under present conditions when all desirable materials are not available, were discussed, and the possible substitution of available materials to attain desired results both in melting practice and in physical properties of the finished castings, were considered.

Closer control of slags and slag characteristics is one avenue of escape, which in some cases can take the place of deoxidizers and other additions which now are difficult or impossible to obtain. Close chemical control of the melting process, through the use of scrap of known content, as well as slag control, is most important in limiting porosity. Pouring temperatures also assume greater importance under today's conditions, and design of the castings to insure sufficient hydrostatic pressure also helps in controling porosity.

Effects of ladle additions on porosity are marked. Scale, rust, or iron oxide in any form is a dangerous addition. Continued remelting of porous material is likely to lock the gas in the molten metal and increase rather than reduce the tendency to make porous castings.

Because of the iron shortage and its resulting increase in scrap use, wise selection of scrap additions is important. In some cases, ladle additions are available which will offset the use of the poorer grades of scrap available today, but in most cases reclassification of scrap and sparing use of material which tends to be harmful is the only good answer.

May meeting of the association will feature sand problems, including a talk by Frank Kleeman, Westinghouse Electric & Mfg. Co., and a sound-color movie on sand by Whitehead Bros. Co.—*R. L. Hartford.*

Northern California

SEVENTY-ONE members and guests were present at the March 13 meeting of the Northern California Chapter of the A. F. A. Chapter Chairman E. M. Welch, American Manganese Steel Division, Oakland, Calif., gave a brief summary of the Del Monte meeting, referring particularly to the part taken by the A. F. A. National President, H. S. Simpson.

As a special guest, V. B. Lawrence, Berkeley Public Schools, outlined the school department's plans for holding training classes for present foundry apprentices. This met with considerable interest and Chairman Welch appointed the following committee to work with Mr. Lawrence: F. A. Mainzer, Pacific Brass Foundry; S. D. Russell, Phoenix Iron Works; Ray Wilson, Columbia Steel Co.

The feature of the meeting was the showing of the sound film "Sand" through the courtesy of Whitehead Bros. Co., New York. The showing was made through the assistance of Ed Posson, operator for Columbia Steel Co., and was ac-

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cepted as a most interesting story of foundry sand.

The meeting then divided into discussion groups. The gray iron foundrymen were led in their discussion by Philip McCaffery; the steel founders took up their discussion under Charles Pierce; Herbert Eggerts was in charge of the discussion for brass foundrymen. Numerous problems relating to the various branches received attention.

Included with the 72 members who were present at the meeting of the Northern California Chapter of the A.F.A. which was held April 10 at the Alexander Hamilton Hotel, San Francisco, were seven members of the Southern California Chapter who paid the group a surprise visit. Under the leadership of Robert Gregg, past chairman of the Southern California Chapter, they made the special trip to San Francisco to meet with gray iron founders of the Northern group.

Chairman E. M. Welch presided and reported five new members enrolled during the past month. Further assistance was promised in the apprentice program being conducted by the Berkeley School department. Sam D. Russell, Phoenix Iron Works, Oakland, Calif. gave a report on progress made in circularizing all Northern California cupola operators in the program laid out by the cupola research committee.

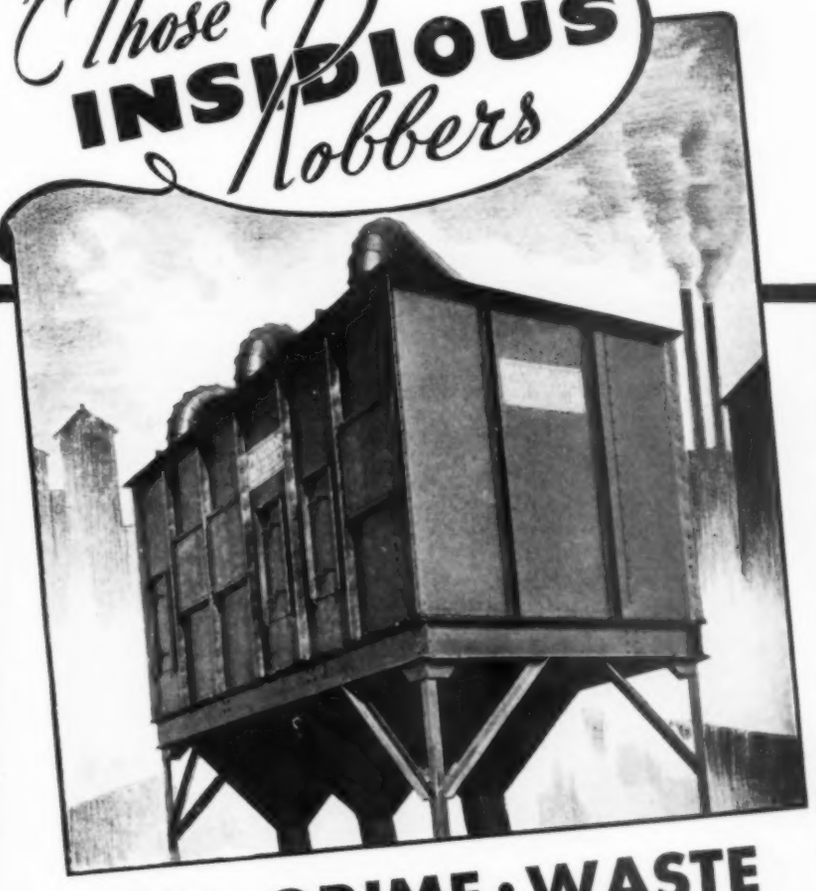
As a special favor the Army Ordnance office made it possible for us to have as a main speaker, Lt. J. W. Scott, who not only handled his own subject, "Ordnance Planning," but also "Ordnance Procurement Problems" which was to have been given by Lt. Ivor de Kirby. Lieutenant Scott gave a clearer picture of ordnance problems than most of the group had had up to that time, and gave some indication of what foundries might be called upon to do in the near future. Another special feature of the meeting was the showing of the new technicolor sound film, "Unfinished Rainbows," the latest contribution by Aluminum Co. of America, which was presented by Ed Posson, Columbia Steel Co., Pittsburg, Calif.—*George L. Kennard, secretary-treasurer.*

Central Indiana

FINAL meeting of the season of the Central Indiana Chapter of the A.F.A. was held at the Washington Hotel, Indianapolis, with approximately 100 members present. H. B. Harvey, Indiana Foundry Corp., Muncie, Ind., and chairman of the chapter presided; B. P. Mulcahy, Citizens Gas & Coke Utility, Indianapolis, was technical chairman.

Alloys and foundry control was the subject discussed by H. C. Aufderhaar, metallurgist, Electro Metal-

Those INSIDIOUS Robbers



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lurgical Co., Chicago. Mr. Aufderhaar stated there has been a definite demand in recent months for higher strength metal. Strength specifications are generally being boosted, and a great number of foundries are confronted with the problem of meeting consistently high strength specifications. In line with that theme, the speaker discussed some of the alloys used for control purposes, with special emphasis on ladle addition of alloys. Many foundries have been obliged to make sudden changes in melting practice owing to scarcity of raw materials, and in hundreds of instances ladle alloys have answered the need satisfactorily.

Election of officers was held, and those to serve for the coming year are: Chairman, B. P. Mulcahy, research engineer, Citizens Gas & Coke Utility, Indianapolis; vice chairman, Richard Bancroft, chief metallurgist, Perfect Circle Co., New Castle, Ind.; treasurer, Robert Langsenkamp, secretary, Langsenkamp-Wheeler Brass Works, Indianapolis; secretary Ralph A. Thompson, Electric Steel Castings Co., Indianapolis. Directors elected to serve 3 years: A. E. Murphy, Hickman, Williams & Co., Indianapolis; Tom Wolfla, John M. Glass Co., Indianapolis; Harold Lurie, Cummins Engine Co., Columbus, Ind. J. P. Lentz, International Harvester Co., Indianapolis, was elected to serve 2 years to fill the unexpired term of Mr. Bancroft, who was elected vice chairman.—*R. A. Thompson, secretary.*

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Western Michigan

WESTERN Michigan Chapter of the A.F.A. held its regular meeting April 13, at the Occidental Hotel, Muskegon, Mich. The meeting was attended by approximately 50 foundrymen who heard two interesting talks. Bob Guthrie, Peoples Gas Co., Chicago, outlined the enormous task ahead of us in winning the war. He pointed out that more and more material would be diverted from civilian consumption and that to win we must really get down to business and put our total effort into the project.

W. E. George, Campbell, Wyant & Cannon Foundry Co., spoke on: "Up Grading of Men." He indicated how key men in industry are spread thinly today and that to fill the gaps, more supervisors and technicians must be trained, quickly and well. The speaker emphasized the point that there should be no obstacles in the path of anyone.—*Max A. Amos, secretary-treasurer.*

Philadelphia

RECENT developments in gray iron was the subject of the March meeting of the Philadelphia Chapter of the A.F.A. held at the Engineers Club, March 13. The speaker, A. B. Kinzel, chief metallurgist, Union Carbide & Carbon Research Laboratories, New York, was introduced by the technical chairman, C. Louis Lane, chief metallurgist, Florence Pipe Foundry & Machine Co.

Dr. Kinzel ably discussed the problem of the small foundry in the production of high test cast iron, and stressed the necessity of oxidizing and deoxidizing of cast iron in order to obtain the character of matrix and the graphite dispersions required to give the desired properties of high test cast iron. He also discussed in detail the action of numerous alloying elements used as oxidizers and deoxidizers.

The after dinner speaker, Michael Dorizas, professor of geography, University of Pennsylvania, spoke on "Events of the Day." His talk on the situation in Europe and in the Pacific with movies covering the war in China, Libya and Russia proved most instructive, interesting and enlightening.

The meeting, one of the most suc-

cessful in the history of the chapter, was attended by 300 members and guests. Harry Reitinger, chairman of the chapter, presided.

At the annual meeting of the chapter held April 9, the following officers were elected for the coming year: Chairman, Douglas J. Peake, Florence Pipe Foundry & Machine Co.; vice chairman, B. H. Bartells, University of Pennsylvania; secretary-treasurer, William B. Coleman, W. B. Coleman Co. Directors: J. M. Robb, Hickman Williams Co.; Roger Keeley, Ajax Metal Co.; Harry Reitinger, past chairman.

—B. H. Bartells, chairman, publicity committee.

New Jersey

IMPORTANCE of control of physical properties of cupola cast irons was stressed by R. K. Glass, metallurgist, Republic Steel Corp., Buffalo, before members of the New Jersey Foundrymen's Association, at the Downtown Club, Newark, Monday, March 23. The speaker declared that he had visited more than 400 foundries and as a result of observations, had come to the conclusion that major difficulties still are due to a lack of technical knowledge of the structural behavior of cast iron.

President of the association, John C. Phelan, Benjamin Eastwood Co., Paterson, N. J., announced the election of J. A. Williamson, treasurer, to take over the post as secretary which recently was vacated by John L. Carter, who is affiliated with the OPA in Washington. A special speaker was J. Edward Phelan, professor, John Marshall College of Law, Jersey City, N. J., and son of the association's president.

Mr. Glass pointed out that the foundry industry has made great strides since prior to the first World War at which time a small percentage of gray iron foundries were required to meet definite chemical and physical properties. Then, generally speaking, a fair surface and good machinability were considered prime requisites. However, over recent years, engineers, demanding better performance, have set up certain specific ranges of physical properties to be met, and consequently foundrymen have become increasingly conscious of the importance of technical control. Views also have changed with regard to metallics needed in making quality castings.

Mr. Glass stated that foundrymen have only begun to discover the many potential properties and applications of cast iron, and remarked in this connection that the gray iron foundry industry should do more in selling itself to the public. The

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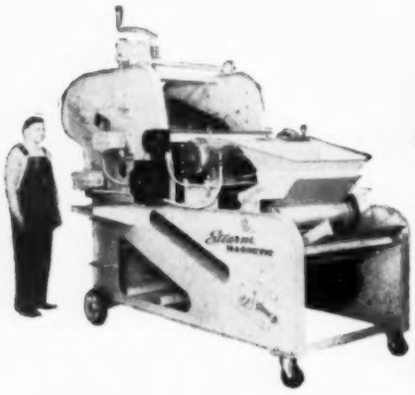
speaker presented 25 slides showing various physical compositions and discussed the failures and advantages of each. He asserted there is a growing trend in the use of heat treated cast iron. He indicated that management must not only recognize that quality castings require technical control, but should provide supervision by men of experience and training backed up with proper materials, and equipment to produce a higher degree of quality castings. He said there must be constant daily control of the many factors involved adding that there are upwards of 50 variables from the design to the finished casting.

Control of all the major variables that affect physical properties of the test bar was emphasized. Cross sectional areas of various sections of a casting may show far greater physical results than the test bar; nevertheless, the castings may be rejected or accepted based solely on results from the test bar. Castings with oval, rectangular, T, Z, or H sections may show as much as four times actual transverse load as the test bar. Test bars, the speaker said, should be poured at the highest temperature. Hand ladles should be hot, not just well dried out. He pointed out too that the difference in permeability of the sand test bar mold changes the rate of solidification. He presented various figures on pouring and cooling temperatures, and said that the cooling rate is an important factor in influencing properties of gray cast iron.—*B. K. Price.*



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Ontario

APPROXIMATELY 120 foundrymen were present at the March 27 meeting of Ontario Chapter of the A.F.A., in the Royal York Hotel, Toronto, to hear the technical paper and to welcome A.F.A. Vice President, Duncan P. Forbes, Gunite Foundries Corp., Rockford, Ill. Chairman N. B. Clarke, Steel Co. of Canada Ltd., presided.

Mr. Forbes brought the greetings of the A.F.A. and of the Northern Illinois-Southern Wisconsin Chapter. He referred to the chapters as the lifeblood of the A.F.A. and indicated how the purposes of the association have been accomplished in a much greater way since the development of the chapters. Mr. Forbes made reference to the convention and to the new developments in books and services which will mean a great deal to association members. He pointed out that many highly interesting developments in castings were resulting from the application of foundry technique to war work. In spite of shortages of materials, foundry production is making good progress in supplying war needs. Referring to the period after the war, Mr. Forbes suggested that there probably would be great advances in the use of aluminum and magnesium in automobile construction.

In discussing gating and risering for pressure work, Harold H. Judson, Goulds Pumps Inc., Seneca Falls, N. Y., dealt particularly upon the nonuse of risers on heavy pressure work. In casting heavy multistage centrifugal pump castings and reciprocating pump cylinders and valve boxes, spongy or open grained spots were sometimes encountered under risers. With larger and higher risers, the spongy spots still persisted, but when risers were eliminated, the spongy spots disappeared. The salient points of practice in producing these castings, weighing 1000 to 2000 pounds, with sections from ⅝-inch to 3½ inches, to be tested at pressures from 500 to 3500 pounds per square inch, are as follows: Molds are poured with hot iron; molds are hard, rigid dry sand; molding sand mixtures and the core mixtures are open and vent freely; iron mixtures contain 25 per cent to 85 per cent rails or structural steel scrap in the charges; deep copes are used to provide a ferrostatic head above the casting; gates are ar-

ranged so that clean iron enters the mold.

Mr. Judson discussed in some detail each of the six principal points in the company's foundry practice on the heavy pressure castings. In the discussion following, Mr. Judson was assisted by J. Nixon, Whitehead Metal Products Co. of New York, Buffalo. The discussion dealt principally with cupola practice involved in production of metal for pressure work of this type.

Special meeting of the nonferrous group of the Chapter was held April 10 at the Royal York Hotel, with approximately 75 in attendance and with Chairman N. B. Clarke presiding. Mr. Clarke turned the meeting over to Joe Sully, Sully Brass Foundry Ltd., Toronto.

First speaker was J. Nixon, Whitehead Metal Products Co. of New York, Buffalo, who spoke briefly on gating and risering of nonferrous pressure castings. Mr. Nixon had some excellent slides showing various types of nonferrous castings and the types of gates and risers used to secure satisfactory results. It was indicated that gating and risering was not a cure-all but that foundry superintendents save a great deal for their companies by proper design and placing of gates and risers. From the experience of Mr. Nixon and the foundrymen present, it was considered advisable to feed into the riser whenever possible. However, it was pointed out that each casting had to be considered individually.

Introducing a discussion of substitutes for tin bronze, K. H. J. Clarke of the Metal Controller's office spoke briefly, emphasizing the serious situation in regard to tin and the necessity for its conservation by various means. A brief discussion of 88-5-5-2 bronze indicated that it generally produced a good pressure casting without any tendency for segregation. Normal foundry practice for gun metal has been found satisfactory, save that there is a greater tendency for oxidation with 88-5-5-2 and it is necessary to add a little phosphor copper to deoxidize the metal.

A large part of the discussion centered around silicon bronzes. Summarizing the discussion briefly, it would appear that silicon bronzes have met with very good success generally for structural castings. There has been a little more difficulty encountered with pressure work, it appears to be chiefly due to the fact that most foundries have had little experience with the material. Some plants have made pressure castings successfully and there are indications that silicon bronze will be suitable for worm gear production.

An interesting discussion of the specific difficulties that certain

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foundries have encountered with silicon bronzes made a real contribution to a more efficient use of the material as a substitute for tin bronzes. Several varieties of silicon bronze are available, and after proper foundry practice has been developed, excellent results can be obtained. The meeting voted that the executive of the Ontario Chapter be asked to choose a committee to co-operate with the metals controller, and particularly to study foundry experience on the various problems that are arising at the present time.—*G. L. White, secretary.*

Chicago

CHICAGO Chapter of the A.F.A. has nominated A. G. Gierach, assistant plant manager, American Manganese Steel Division, American Brake Shoe & Foundry Co., Chicago Heights, Ill., as chairman for 1942-43, to succeed L. L. Henkel, metallurgist, Interlake Iron Corp., Chicago. Nominee for vice chairman is M. F. Becker, vice president, Whiting Corp., Harvey, Ill. For secretary, F. W. Hintze, salesman, Illinois Clay Products Co., Chicago, has been nominated and Charles C. Kawin president, Charles C. Kawin Co., Chicago, was nominated for re-election.

Nominees for directors to serve 3 years are as follows: Arthur S. Klopf, vice president, Hansell-Elcock Co., Chicago; R. A. Lindgren, superintendent of blast furnace department, Wisconsin Steel Co., Chicago; E. R. Young, metallurgical engineer, Climax-Molybdenum Co., Chicago; and retiring chairman, L. L. Henkel. The nominations were announced at the April 13 meeting of the chapter, election will take place at the May 11 meeting.

Sectional group discussions comprised the program for the April meeting. Don. J. Reese, foundry research engineer, International Nickel Co. Inc., New York, addressed the gray iron and malleable group on "Cupola Practice for High-Test Iron." H. K. Briggs, sales metallurgist, Miller & Co., Chicago, was chairman. Eugene W. Smith, Eugene W. Smith Inc., Evansville, Ind., spoke before the nonferrous group on "sand," with Cliff McKelvey, superintendent of brass foundry, Chicago Hardware Foundry Co., North Chicago, Ill., chairman. The steel group had S. E. McGinty, metallurgist, Burnside Steel Foundry Co. Chicago, as its speaker on the subject of "Pouring Methods and the Care of Ladles." W. H. Parker, superintendent, American Steel Foundries, East Chicago, Ind., was chairman.

An interesting feature of the coffee hour following dinner was the showing by the Aluminum Co. of America of its new technicolor sound motion picture, "Unfinished Rainbows." The film, tracing the history and development of aluminum, was highly applauded.

The chapter held its annual Ladies Night party in the Terrace Casino of the Morrison Hotel, April 11, with nearly 1000 attending. Instead of receiving favors, the ladies participated in a drawing for a generous number of $25 war bonds. J. C. Gore, Werner G. Smith Co., Chicago, was chairman of the general committee.

Program for the May 11 and concluding meeting of the year will be an "Information Please."—*Erle F. Ross.*

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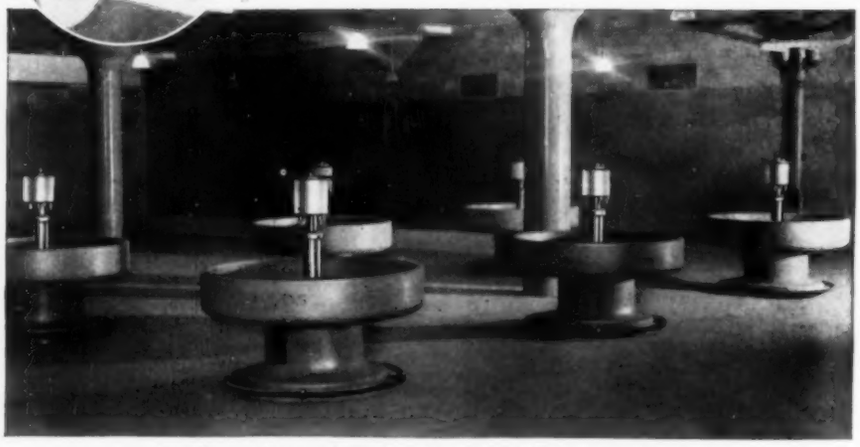

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N. Illinois — S. Wisconsin

APPROXIMATELY 50 were present at the regular monthly meeting of the Northern Illinois-Southern Wisconsin Chapter of the A.F.A. held at Hotel Hilton, Beloit, Wis. on April 14, to hear R. G. McElwee, Vanadium Corp. of America, Detroit, tell of "Recent Developments in Cast Iron."

Mr. McElwee stated that the foundry industry—particularly gray

iron jobbing foundries, had a job of selling to do. Designing engineers must be sold on the possibilities and advantages of using the present castings in places where the conventional 15,000 pounds per square inch tensile iron of 20 years ago never could have been used. The so-called captive foundries have led the way, replacing forgings for crankshafts, camshafts, and other less publicized parts. The jobbing foundry now must take up the challenge and persuade the general public that they too can produce quality castings. Great strides have been made recently in developing alloys to make results more uniform in jobbing work—working toward the goal of gray iron castings of controlled physical characteristics to fit the job required of the castings.

Next meeting will be held at Hotel Hilton, Beloit, Wis. on May 12. Election of officers will be held and a representative of the F.B.I. will be present to talk on the relation of F.B.I. to the defense effort.—*J. R. Cochran, technical secretary.*

Wisconsin

WISCONSIN Chapter of the A.F.A. returned to its normal routine, after a highly successful foundry conference, with its sectional meetings held Friday, March 20.

After dinner, two motion pictures produced by International Harvester Co., Chicago entitled, "The Marines Have Landed," and "The Strong Shall Be Free" were shown to the entire group. Arrangements for the pictures were made through R. J. Anderson of Belle City Malleable Iron Co., Racine. After the showing, the meeting broke up into the following groups:

Frank Kulka, general superintendent, Motor Castings Co., and chairman of the gray iron group presented the speaker, Joseph Gitzen, Delta Oil Products Co., who gave an interesting talk on core oils, their manufacture, and bonding of core sand mixes. An important discussion developed on the use of iron oxide and chrome oxide in cores. Application of black core oils was thoroughly discussed. The fact that they are produced to specification at present is important.

D. I. Dobson, factory manager, General Malleable Corp., and chairman of the malleable group presented H. E. Fellows, Milwaukee Foundry Equipment Co. Mr. Fellows spoke on advanced molding machine practice and equipment. He gave quite a history of molding machines in foundries and pointed out the increase in production of castings, also the improvement in quality of castings which the molding machine has made possible. It also was brought out how molding machines

HERE are two brand new books on Dust Control that every foundry should have. One contains information on the "Dustube" cloth bag type dust collector (Catalog No. 72); the other describes the "High Efficiency Cyclone" dust collector (Catalog No. 82.) Both have sections on engineering data that contain up-to-the-minute facts on modern dust control. Write for one or both of these catalogs today.

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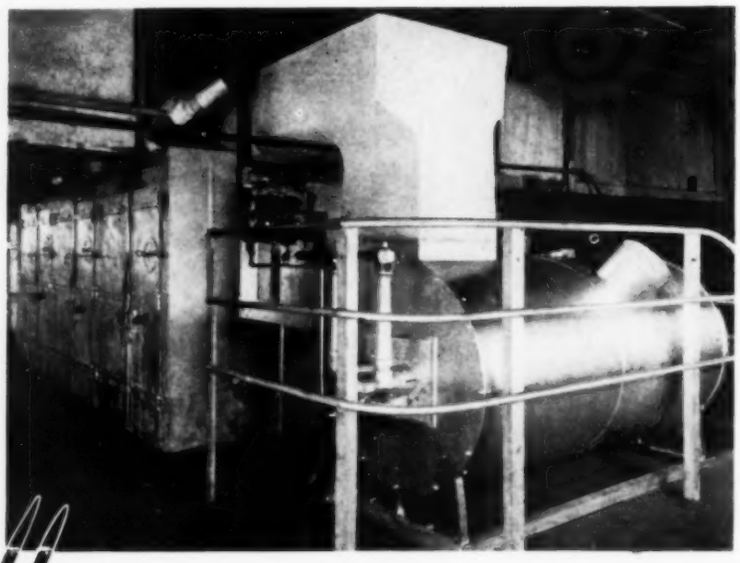
have made it possible to train molders for machine molding in a shorter period of time than was required for old methods of hand ramming, etc. Attendance at this group meeting was 35.

The nonferrous section of the meeting was attended by about 17 men. The subject covered in general was on the use of secondary aluminum in place of primary alloy as has been directed recently by the W.P.B. The topic was well presented by R. Brown, Jobbins Co. and the group was much interested. Mr. Brown outlined some of the difficulties of producing a definite alloy out of borings of good quality which would compare favorably in analysis and physical properties with the primary metal so that it would be acceptable to government departments. L. A. Pankratz, Quality Aluminum Co., was chairman.

The steel group with Fred A. Pritzlaff, foundry superintendent, Falk Corp., as chairman, drew a capacity crowd to hear N. F. Koch, Milwaukee Steel Foundry Division, Grede Foundries Inc., and C. F. Haertel, assistant foundry superintendent, Falk Corp. speak on "Heading and Gating."

Mr. Koch spoke on gates and risers commonly used on small to medium sized castings for both carbon and alloy steels. Topics touched on included the advantages and disadvantages of various types of gates; the use of multiple gates; round risers versus rectangular risers; blind risers; the use of the mold reversal method. He also described in detail, the practice of using flogging cores in risers, which permits easy removal of the riser from the casting.

Mr. Haertel's talk dealt mainly with gate and riser applications for heavy carbon steel castings, ranging up to 90 tons. He spoke on the fundamental requirements of a good gate and described the various types of gates suitable for heavy work. In the part of his talk devoted to risers, he discussed the use of annular risers, experiences with various types of blind risers; methods used in removing extremely large risers from castings and the yield obtained on various types of castings. Mr. Haertel illustrated his talk with slides showing the various stages in the production of cast steel gears and other large miscellaneous castings at the Falk Corp. The slides showed clearly the gating and heading used on different sizes of gears. Attending members showed their interest by discussing freely the points made by the speakers.—*G. K. Dreher, secretary.*



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New England

APPROXIMATELY 85 members and guests attended the regular monthly meeting of the New England Foundrymen's Association which was held at the Engineers' Club, Boston, April 8. The meeting was presided over by President Raymond Meader. Speaker was Ralph R. Meigs, assistant chief engineer, Loss Prevention Department, Liberty Mutual Insurance Co., Boston, whose subject was "Accident Prevention."

Mr. Meigs made the point that safety should be made a part of normal plant operation rather than something to be forced onto employes. He said that it was just as much a mistake for an employe not to be able to recognize the cause of a possible accident as it was for that employe to leave a core out of a mold. In other words, the man works toward accident control as he would toward perfection in his job. In most cases causes of accidents are technical and like the basic principles of foundry practice, when effectively applied in the production of castings, will conserve time, manpower and material.

Minor accidents or mishaps, where no one is injured, often give warning of serious accidents to come if not properly heeded or prevented. In some foundries, accidents peculiar to the industry are at a minium, while little things like falling or

bruises, etc., seem to predominate.

Safety control can be brought about effectively by: A safety program instituted by management; installation of modern safety devices by management; constant effort on the part of management to get employe co-operation. A safety program is an intangible program and unless given impetus from time to time, gradually deteriorates or peters out entirely. Regular publicity and follow-up is not only desirable, but necessary to insure continued safety control. The question of green help, now so important a factor, can be handled effectively by acquainting the new men with the hazards peculiar to their job. In conclusion, Mr. Meigs reiterated the fact that safety control should not be emphasized as such, but should be incorporated into every day practice as a part of the technique which goes with the job.

After the talk, many questions were asked and considerable discussion followed.—*Merton A. Hosmer.*

Connecticut

MEETING of the Connecticut Foundrymen's Association was held at the Quinnipiak Club, New Haven, Conn., March 27. Bice Clemow of the War Production Board and executive secretary for the State of Connecticut Salvage Commission was introduced. He spoke briefly on the efforts being made to keep scrap materials in the state for use by the state's foundries.

The speaker of the evening, Dr. J. A. Ridderhof, Frederic B. Stevens Co., was then introduced by the association's president, Robert Mills. Dr. Ridderhof gave a very interesting talk on foundry facings, used both in cores and in main and side floor work. A discussion period followed at which it was brought out that the use of domestic graphite would have to be speeded up in the very near future because Ceylon graphite shortly will be unobtainable.—*Henry C. Griggs, secretary.*

Western New York

WESTERN New York Chapter of the A.F.A. held its April meeting on Friday, the 3rd in Rochester, N. Y. Dinner was served in the Faculty Club of Rochester University to about 40 members and guests. Following the dinner, Al Sigl, newspaperman and radio commentator of the Gannett papers gave a most interesting talk on his radio experiences. He gave a stirring portrayal of the work being accomplished on a purely voluntary basis by an organization which he started, Legion of Blood Donors, and which has expanded into membership of thousands now serving almost nationally.

The meeting then moved to the auditorium to hear William J. Picard, chairman, Board of Standards and Appeals of New York State. He discussed the relationship between the state government and the foundry industry which has become so much more intimate through the adoption of a new foundry code which was effective Feb. 1. Mr. Picard talked to the group last year and paid the industry a handsome compliment by describing its co-operation as a matter of action rather than words. During an extended question and answer period, many more unseen avenues of co-operation were indicated for future use.—*Eliot Armstrong, secretary.*

Northern Iowa

APPROXIMATELY 50 members and guests attended the March 31 meeting of the Northern Iowa Foundrymen's Association which was held at Black's Tea Room, Waterloo, Iowa.

Fred J. Walls, Development and Research Division, International Nickel Co., Detroit, talked on "Problems Confronting the Foundry In-

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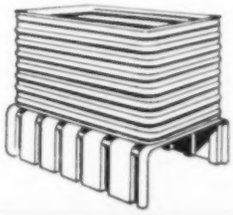

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dustry." Mr. Walls brought out the fact that since the war is in reality a war of production, we must generate a spirit of production that will be strong enough to bring victory. In this connection, the speaker emphasized that small shops, now seriously curtailed in their regular production on account of priorities, should go after any sort of job that can be run in these plants, even if it means using only one machine. That effort, if properly made, would go a long way to ease the pressure on the machine tool industry. In speaking of the strides now being made in increasing steel production, Mr. Walls mentioned briefly the place of the converter in connection with the electric furnace in the making of steel for castings.

During the discussion, Mr. Walls told of the progress being made in the development of aluminum and magnesium casting industries and how those industries are helping in the war effort.—*F. R. Snyder, secretary.*

St. Louis

APRIL 10 meeting of the St. Louis District Chapter, A.F.A., was held at Hotel DeSoto, and was called to order by Chairman Carl Morken.

The chairman announced the appointment of a nominating committee composed of: Roy Jacobsen, chairman; L. Farquhar, Webb L. Kammerer, R. Durkan, Jess Bodine and H. Harte.

Harold Wiese presented a printed request to the group asking their preference as to an afternoon or evening June picnic. The consensus was than an evening picnic would be preferable in view of the current work situation. John Williamson, chairman of the membership committee, pointed out the growing membership of the chapter and Chairman Morken indicated that the present membership was the highest in the history of the group. Various out of town visitors were introduced.

C. B. Schanley, vice chairman, introduced T. M. Roberts, assistant chief chemist, Coke Division, Laclede Gas Light Co., who presented an illustrated lecture on the manufacturing processes used.—*J. W. Kelin, secretary-treasurer.*

Toledo

APRIL 10 meeting of the Toledo Chapter of the A.F.A. was held at the Hillcrest Hotel, Toledo, O., with 45 present. Chairman Victor Zang, Unitcast Corp., opened the meeting by explaining the program being started at the University of Toledo. Classes in defense training have been organized to acquaint men with foundry practice. As the future increase of production and loss of workers to the draft results in the need for more trained foundry workers, an adequate supply will be available for the foundries in the locality.

George Palmer, assistant manager of the Toledo office of the United States Employment Service, gave a short talk on the work being done by that office to help local foundries get the type of men needed for foundry work. He urged that foundrymen take advantage of the splendid service being offered by the government because it is well organized and scientifically managed and is capable of handling many of the employment problems of the foundry today.

Principal speaker of the evening was Leslie Brown, Magnesium Fabricators Division, Bohn Aluminum & Brass Corp., who spoke on "Sand Casting of Magnesium Alloys." His paper was most interesting and informative to those present since it covered the whole process of magnesium casting from the source of the raw material through all the steps necessary to produce good magnesium castings. His talk was supplemented by a number of sample magnesium castings which the members inspected during the discussion period following the talk.—*George W. Buchanan, reporter.*

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THE condition of sand cut with a Sandcutter is unexcelled, for it can be prepared in accordance with individual requirements for moisture, bond and permeability. It riddles fast, rams easily and vents perfectly.

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After the sand has been cut through, the entire heap can be piled beside the molding machine or between benches. There are certain definite production economies which the Sandcutter will effect. Among these are the following: (1) It eliminates drudgery and conserves labor by eliminating shoveling; (2) by thoroughly tempering the sand it largely overcomes common molding faults, such as drops, scabs and runouts; (3) molders put up more molds per day; (4) uniformity of sand makes uniform castings; (5) lower discount losses; (6) the finish of castings is smoother; and (7) the sand cools rapidly in cutting—a great advantage in double-heat and continuous pouring shops.

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Birmingham

REGULAR monthly meeting of the Birmingham District Chapter of the A.F.A. was held March 20 and Chairman, J. A. Bowers, American Cast Iron Pipe Co. presided. He gave a complete report on the foundry practice conference, and thanked all those who had anything to do with the success of the meeting.

T. H. Benners reported on the apprentice training course. A. S. Holberg gave a membership committee report and Chairman Bowers complimented him for the work he has done on that committee for the past 3 years. Mr. Bowers appointed the following as a nominating committee: H. J. Noble, W. Carson Adams and R. L. Ogden. He appealed to the membership to make every attempt to attend the national convention.

Harry A. Whiting, Illinois Cereal Mills Inc., Paris, Ill., principal speaker for the meeting was introduced by Mr. Bach, a member of the chapter. Mr. Whiting gave an excellent paper on cereal binders. It was most interesting and instructive, and from the discussion that followed, considerable interest was shown by the 55 members and guests present.—*H. G. Mouat, secretary.*

Metropolitan

ONE hundred sixteen men attended the dinner and over 200 were present for the lecture at the April 6 meeting of the Metropolitan Chapter of the A.F.A. held at the Essex House, Newark, N. J. Daniel Polderman, Whiting Corp., presided over the meeting. "Aluminum and Magnesium Castings" was the topic of the evening. With Harry G. Lamker, foundry superintendent, Wright Aeronautical Corp. as speaker, and William Wilson Jr., foundry superintendent, Eclipse Aviation Division, Bendix Aviation Corp. as technical chairman, the light metal casting situation was covered thoroughly.

Mr. Lamker discussed all phases in the manufacture of aluminum and magnesium castings. He outlined the generally accepted melting procedures; then described the defects which can occur, their causes, and the methods for eliminating them. In melting aluminum, iron pots are used since they offer easier stabilization of metal temperature. Pyrometers are used for temperature control. Chlorine and sometimes nitrogen are used for purifying the metal; freezing and remelting helps to eliminate pinhole porosity. To get good castings consistently, it is necessary to watch melting and pouring temperatures, and to avoid soaking and rapid cooling of the molten metal.

Magnesium melting makes use of the flux pots for remelting scrap and steel crucibles for melting and pouring. Superheating the metal in the crucible reduces subsequent grain size. Fluxes are added during melting to purify the metal and keep it from burning. They should never be added just before pouring since they will enter the mold cavity with the metal. Synthetic sand is used for aluminum and magnesium since it has a high permeability and can be easily controlled. Oil sand cores are used in nearly all light metal foundries.

Mr. Lamker pointed out that most of the defects, such as coarse grain, excessive intercrystalline shrinkage, flux inclusions, pitting, and cold shuts, may be attributed, in general, to improper melting and pouring technique.—*R. E. Ward, assistant chairman, publicity committee.*

Michiana

REGULAR meeting of the Michiana Chapter of the A.F.A. was held April 13, at Hotel LaSalle, South Bend, Ind. Approximately 60 were present and L. L. Andrus, secretary-treasurer of the chapter and vice president in charge of sales, American Foundry Equipment Co., Mishawaka, Ind., presided at the

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meeting. Principal speaker was I. R. Wagner, vice president, Electric Steel Castings Co., Indianapolis, who presented a color sound film showing foundry operations at the Electric Steel Castings plant, Indianapolis. The film originally was prepared to illustrate foundry operations to people who know little or nothing of the trade, and was used before businessmen's clubs, etc. It later was found to have great value in the training of new employes in order to show them what actually occurs at each point in the foundry operation. That use of the film has proved so important that Mr. Wagner contemplates the making of a second film designed particularly for the purpose, and recommended that all foundrymen consider its value for employe training.

Mr. Andrus presented to the chapter a brief report covering financial condition and membership in the chapter, and requested recommendations for new officers and directors and suggestions for next year's program.

V. C. Bruce presided over the chapter's annual quiz program in which questions solicited by mail were read from the chair. Answers were given by members of the chapter, and answers were judged by a board of experts including: A. C. Arbogast, Northern Indiana Brass Co., Elkhart, on nonferrous work; C. F. Carson, National Supply Co., Toledo, on steel and gray iron practice; E. O. Stamm, Buckeye Products Co., Cincinnati, on core room practice. Prizes of cigarets and cigars were distributed to the men making the best answers.—*L. D. Andrus, secretary-treasurer.*

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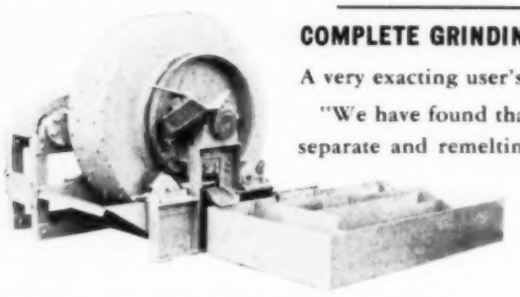

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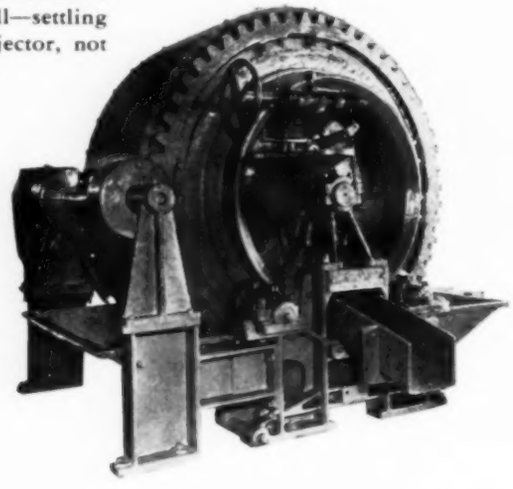

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Connecticut Nonferrous

ONE of the largest groups ever to attend a meeting of the Connecticut Nonferrous Foundrymen's Association was present at the meeting of March 18 held at the Union League Club, New Haven, Conn. R. J. Keeley, Ajax Metal Co., Philadelphia, spoke on "Silicon Bronze Substituting for Tin Bronze." Mr. Keeley in pointing out the various benefits of silicon bronze alloys and their general uses, brought out that silicon bronze would be suitable for many castings now being made with tin bronzes. He added that it is important to control temperatures and make liberal allowances for shrinkage; also it is important to keep silicon bronzes from contaminating other alloys carried in the foundry. Silicon bronze has been used successfully for bearings but must have careful lubrication. The alloy is suitable for gears and other classes of work.

President Ernest F. Stone, Manning Maxwell & Moore Co., presided at the meeting and appointed the entertainment committee with Fred B. Clarke, Whitehead Bros. Co., as chairman, to arrange and plan the annual entertainment to be held June 19, Wilcox's Pier Restaurant, New Haven, Conn. Others on the committee include: D. W. Case, Belknap Mfg. Co., vice chairman; T. Joseph Judge, and Joseph Shannon, Jenkins Bros. Inc.; Herbert Dingee, Springfield Facing Co.; Frank Diana, Whipple & Choate Co.; Stafford Chappel Jr., Electric Boat Co.; Paul Trook, Joseph Dixon Crucible Co.; Howard Gillis, Precision Grinding Wheel Co.; C. P. Crotty, Nassau Smelting & Refining Co.; and D. F. Sawtelle, Malleable Fittings Co.

Before arranging the association's annual outing, a letter was sent to the White House asking if such an affair would be permissible. Stephen Early, secretary to the president replied as follows: "I think it is well to remember that anything which promotes wholesome recreation and builds up morale will contribute in just that measure to winning the war."

The association's meeting of April 15 was held at the Union League Club in New Haven, with E. R.

Crandall, research engineer, Mullite Refractories Co., Shelton, Conn., as speaker. His subject was, "Nonferrous Refractories." A large attendance was present and President Ernest F. Stone appointed several members to serve as a committee to make notes at the A.F.A. convention in Cleveland and report on their observations at the association's meeting to be held May 20 at the Indian Hill Country Club, New Britain, Conn.—*Louis G. Tarantino, secretary.*

Cincinnati

STUDENTS in industrial training in all high schools of Greater Cincinnati were invited to attend the regular meeting of the Cincinnati District Chapter of the A. F. A., held at Hotel Alms, Cincinnati, March 10. One hundred forty were present and R. J. Redmond, Buckeye Foundry Co., Cincinnati, presided. Speakers included: Herman K. Ewig, Cincinnati Milling Machine Co.; R. J. Redmond, Buckeye Foundry Co.; Edward B. Hausfeld, Ohio Pattern Works & Foundry Co.; Charles A. Appel, Lunkenheimer Co. all of whom spoke on the general subject of pattern making and molding.

In keeping with the special occasion, the usual dinner preceding the meeting was dispensed with, and instead a light buffet lunch was served after the meeting. The prize patterns which had been submitted in the 1941 A. F. A. apprenticeship contest in patternmaking were on display. Speakers referred to the patterns during the course of the meeting and after the formal discussion, various groups of boys gathered around different patterns for further explanation by chapter members.

In opening the meeting, Mr. Redmond sketched the development of the foundry industry from its inception to its present major importance in the national defense program. Mr. Ewig explained a number of points about molding and pattern making and blueprint reading. His presentation was facilitated by individual blue prints and reprints of the article, "Review of Patterns submitted in 1941 Apprenticeship Contest" from the January 1942 issue of the *American Foundryman*, with which each boy had been provided. Mr. Redmond explained cupola operation from a large sectional drawing. This was particularly appropriate because many schools teaching foundry practice do not have a cupola in their equipment.

Following the talks was a question period, during which many boys showed their interest by a number of questions which were answered by various A. F. A. members.

Personnel relations was the topic which was discussed at the April 7 regular meeting of the Cincinnati District Chapter of the A.F.A. Meeting was held at the Netherlands Plaza Hotel, and the speaker was Charles W. Jones, general superintendent, William H. Block Co., Indianapolis. Fifty were present for the meeting and William Ball Jr., Edna Brass Mfg. Co., and chairman of the chapter, presided. In introducing the speaker, Mr. Ball referred to the importance of personnel in winning the war.

Mr. Jones opened his discussion by defining personality as "behavior pattern." What he had to say about personnel relations applies equally well to the foundry as to department stores. While some of those who heard this well presented address may have known some of the points discussed, all agreed that it is well to be reminded of them.

B. P. Mulcahy, Citizens Gas & Coke Utility, Indianapolis, will discuss, "Foundry Coke and Cupola Operations" at the May 12 meeting of the chapter to be held at the Netherlands Plaza Hotel.—*Henry M. Wood, secretary.*

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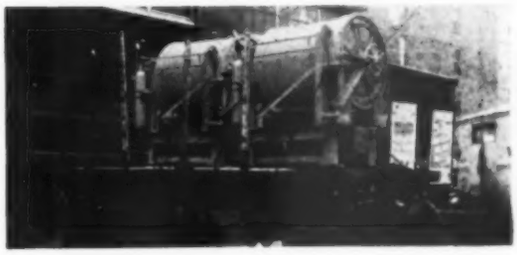

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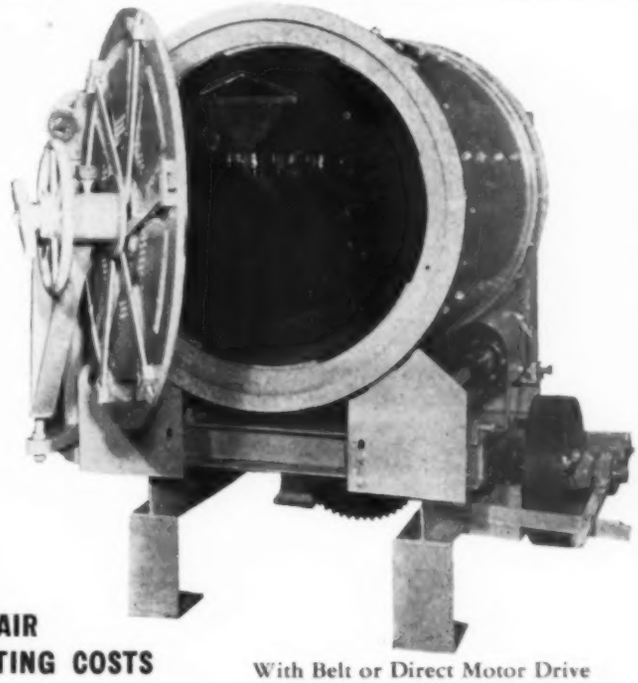

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Northeastern Ohio

EXAMPLES of rather unusual cupola practice in a foundry melting 750 tons per day were presented by John Lowe, Battelle Memorial Institute, Columbus, O., before 125 members and guests, Northeastern Ohio Chapter of the A.F.A., at the Tudor Arms, Cleveland, April 9. C. E. Westover, executive vice president A.F.A., Chicago, presented interesting comments on the immense amount of work and planning involved in staging an annual convention and exhibition, particularly in recent years where the facilities of only a few cities are in position to cope with the display and attendance.

Chairman Frank Dost, Sterling Foundry Co., Wellington, read the list of nominations of officers for the coming term as follows: President, J. H. Tressler, Hickman Williams & Co.; vice president James G. Goldie, Cleveland Trade School; secretary Jack Lathrop, THE FOUNDRY; treasurer Russell F. Lincoln, Osborn Mfg. Co. Directors 3-year term: Frank J. Dost, retiring president; E. A. McDonald, Berted Foundry Co., Columbiana, O.; E. M. Follman, Griffin Wheel Co.; J. J. Witenhafer, Lake City Malleable Co.; Tom Johnston, Republic Steel Corp. Fred Pascoe, Westinghouse Electric & Mfg. Co., was nominated to fill the unexpired term of Mr. Goldie.

Melting units in the plant described by Mr. Lowe included six cupolas, an electric furnace and a converter to make possible the production of metal held to close specifications as a whole, but with individual lots varying to a considerable extent in chemical composition and physical characteristics. Charges consisted of pig iron, cast iron and steel scrap, briquets prepared on the premises, and various amounts of the different alloys usually employed in the production of high class iron castings. The speaker discussed the life of refractories exposed from 16 hours per day, to steady operation for 5 days. A water cooled lining 36 inches high faced with 3-inch refractory bricks gave satisfactory service.—*Pat Dwyer.*

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Minnesota U.

MEMBERS of the Student Chapter of the A.F.A. at the University of Minnesota, Minneapolis, are working on several individual research projects of foundry interest. These will provide subject matter for papers to be submitted in a technical paper contest, sponsored by the Twin City Chapter of the A.F.A. for the student group. Announcement of the winners and the reading of the winning papers will take place at the May 25 meeting of the Twin City Chapter. Prizes offered are: First, $20; second, $10; third, $5. The judging committee for the contest is composed of Herbert F. Scobie, University of Minnesota, Foundry Department, who is chairman; H. H. Blosjo, Minneapolis Electric Steel Castings Co.; and A. F. Carlstrom, Smith, Sharpe Co.—*S. S. Silberg, secretary.*

Wadsworth Acquires Core Machines

Wadsworth Core Machine & Equipment Co., Akron, O., recently has purchased the Hammer and Rapid types of core machines formerly manufactured by the American Foundry Equipment Co., Mishawaka, Ind. These machines will be added to the line of core making equipment, core cutting off and other machines which have been produced by the Wadsworth company.

Battelle Memorial Institute, Columbus, O., recently has published a 48-page booklet listing more than 500 books, articles and patents written and developed by staff members of the institute from 1929 to 1940.

SPLENDID SHOW POINTS WAY TO OUTPUT

(*Continued from page 98*)

Trade School attracted a great amount of attention. Castings and patterns entered in the national apprentice contest were on display near the trade school exhibit. Winners of the contest are reported elsewhere in this issue.

The complete list of exhibitors at the 1942 Cleveland show is as follows:

Adams Co.; Ajax Electric Co.; Ajax Electric Furnace Co.; Ajax Electrothermic Corp.; Ajax Metal Co.; Albany Sand & Supply Co.; Alpha-Lux Co.; American Air Filter Co.; American Crucible Co.; American Foundry Equipment Co.; *American Metal Market;* American Optical Co.; American Society for Metals; American Steel Abrasive Co.; Anderson & Brown; Arcade Mfg. Co.; Automatic Transportation Co.; Ayers Mineral Co.

Baker-Perkins, Inc.; C. O. Bartlett & Snow Co.; Bay State Abrasive Co.; Alfred M. Best Co.; Black, Sivalls & Bryson, Inc.; Blaw-Knox Co.; Blystone Corp.; Buckeye Products Co.; Adolph I. Buehler; Business Publishers International Corp.

Campbell-Hausfeld Co.; Canadian Radium & Uranium Corp.; Edwin S. Carman, Inc.; Certified Core Oil & Mfg. Co.; Champion Foundry & Machine Co.; Chicago Mfg. & Distributing Co.; Chicago Retort & Fire Brick Co.; Clearfield Machine Co.; Cleveland Blow Pipe & Mfg. Co.; Cleveland Flux Co.; Cleveland Tractor Co.; Cleveland Quarries Co.; Cleveland Trade School; Climax Molybdenum Co.; L. A. Cohn & Bro., Inc.; Combined Supply & Equipment Co.; Conco Engineering Works; Continental Roll & Steel Foundry Co.; Corn Products Sales Co.; Crucible Furnace Co.

Daily Metal Trade; Davenport Machine & Foundry Co.; Dayton Oil Co.; Delhi Foundry Sand Co.; Delta Oil Products Co.; Wm. Demmler & Bros.; Despatch Oven Co.; Detroit Electric Furnace Div., Kuhlman Elec. Co.; DeWalt Products Corp.; Harry W. Dietert Co.; Jos. Dixon Crucible Co.; Dodge Mfg. Corp.; Dougherty Lumber Co.; Duquesne Smelting Corp.

Eastern Clay Products Inc.; Electro Refractories & Alloys Corp.; Elwell-Parker Electric Co.; Eutectic Welding Alloys, Inc.

Fanner Mfg. Co.; Federal Foundry Supply Co.; Federated Metals Division American Smelting & Ref. Co.; Fisher Furnace Co.; THE FOUNDRY; Foundry Equipment Co.; Freeman Supply Co.; Fremont Flask Co.; Frontier Bronze Co.

General Blower Co.; Globe Steel Abrasive Co.; Gray Iron Founders' Society; Great Lakes Foundry Sand Co.; Great Western Mfg. Co.; Grimes Molding Machine Sales; Grob Bros.

Benj. Harris & Co.; Hercules Powder Co.; Herman Pneumatic Machine Co.; Hickman, Williams & Co.; Hill & Griffith Co.; Hines Flask Co.; Hoffman Foundry Supply Co.; E. F. Houghton & Co.; Hougland & Hardy, Inc.; Hydro-Blast Corp.

Illinois Clay Products Co.; Illinois Testing Laboratories, Inc.; Industrial Minerals Co.; Industrial Silica Corp.; International Harvester Co.; International Molding Machine Co.; International Nickel Co.; Ironton Fire Brick Co.

Jefferson Machine Tool Co.; Johnston & Jennings Co.

Kindt-Collins Co.; H. Kramer & Co.; Kron Co.

Lancaster Iron Works; Lava Crucible Co. of America; R. Lavin & Sons, Inc.

J. S. McCormick Co.; *Machine Design;* Macklin Co.; Mahr Mfg. Co. Division Diamond Iron Works; Mall Tool Co.; Malleable Founders' Society; Marathon Chemical Co.; Martindale Electric Co.; Master

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Tool Co.; Mathews Conveyer Co.; Michigan Smelting & Refining Co.; Midwest Abrasive Co.; H. E. Mills Mfg. Co.; Milwaukee Foundry Equipment Co.; Mine Safety Appliances Co.; Modern Equipment Co.; Monarch Engineering & Mfg. Co.; Jas. A. Murphy & Co.

National Bronze & Aluminum Foundry Co.; National Engineering Co.; Newaygo Engineering Co.; *New Equipment Digest;* New Jersey Silica Sand Co.; Niagara Falls Smelting & Refining Co.; Wm. H. Nicholls Co.; Nonferrous Founders Society.

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THE BEST

ain't enough!

★ ★ ★

With "all-out" schedules hitting an all time high for speed—it isn't enough to get the Best Chaplets and Chills. That's why we've stepped up our schedules to meet the requirements of foundry men who demand the best—*when they need them.*

Milwaukee Thread Stem Chaplets

Schmitz Chaplets · Standard Radius Chills

Patented Adjustable Radius Chills · Other Foundry Supplies

Adventures of Bill

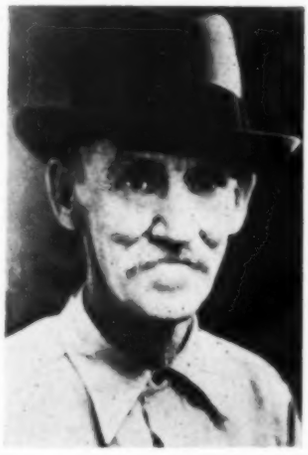
(*Concluded from page* 128)

three or four days. The tanks then are lifted and lowered on to the cleaning room floor.

"When the clamps or bolts are removed from the bottom the tank is removed leaving the wheels in position to be placed in the tumbling barrels, or other pieces of cleaning equipment. An alternative method, and if the equipment is available, the castings could be loaded on a car, or for that matter piled on the floor of a small annealing furnace fired with gas, oil, powdered coal or electricity. They are raised to a temperature of 1000 degrees Fahr., held at that for an hour and then allowed to cool slowly. Under emergency conditions small wheels and other castings have been annealed satisfactorily by bringing them to a red heat in a wood fire and then burying them in dry ashes. Several firms advertising in THE FOUNDRY are prepared to supply ovens and furnaces of all types for heat treating."

Obituary

JOHN CUNNINGHAM, one of the oldest molders still actively engaged in foundry work in the United States, died March 21, 1942 at Muskegon Heights, Mich. Mr. Cunningham was born in



John Cunningham

Roundout, N. Y., Nov. 22, 1863. Moving to Illinois with his parents he became a molder apprentice with the National Tube Co., Kewaunee, Ill., at the age of 12, serving 4 years there. He then, at his own insistance, served 2 additional apprentice years on the jobbing floor of a Chicago foundry, after which he worked for several years in various foundries throughout the country. In 1908 he moved to Muskegon to take charge of the foundry of the Rodgers Iron Works. He became a Campbell, Wyant & Cannon Foundry Co. employe in 1911 and remained with that firm until his retirement about 2 years ago. During his spare time he studied stationary engineering. Mr. Cunningham spent 66 years working in foundries.

* * *

Henry B. Carse, 76, president, Electric Boat Co., Groton, Conn., builder of submarines, died April 13.

* * *

S. Forry Laucks, 72, president, York Safe & Lock Co., York, Pa., died April 11, at his home in Wrightsville, Pa.

* * *

Peter Bendixon, 69, superintendent of the former Bettendorf Co., Davenport, Iowa, for 40 years, died in Davenport, March 23. Mr. Bendixon retired 3 years ago.

* * *

Harry H. Biggert, 66, formerly vice president in charge of manufacturing, J. I. Case Co., Racine, Wis., died in Boston recently. Mr. Biggert joined the Case company in 1928 after resigning as vice president, Emerson - Brantingham Co., Moline, Ill. He began his industrial career with the Deere Works, International Harvester Co., of which he was factory superintendent and vice president in Chicago.

* * *

Robert F. Vogt, 62, chief consulting engineer, Allis-Chalmers Mfg. Co., Milwaukee, died April 17 in Milwaukee. Mr. Vogt had been with Allis-Chalmers 36 years.

* * *

Hopkin Williams, 76, died March 31 at his home in Cleveland. Mr. Williams served an apprenticeship of 7 years in a foundry in Wales and then came to the United States where he worked in several foundries in Alliance, O., and Cleveland. In 1929 he established his own business as sales and distribution agent for several industrial manufacturing firms.

* * *

Dr. Arthur N. Talbot, 84, professor emeritus of engineering, University of Illinois, Champaign, Ill., and internationally known as an investigator and teacher in that field, died in Passavant hospital, Chicago, April 3. Dr. Talbot was born in Cortland, Ill., and graduated from the University of Illinois in 1877. He

worked as an engineer on railroad location, construction and maintenance, and subsequently joined the school's faculty in 1885.

* * *

William D. Alexander, 75, retired president of the former Albany Malleable Iron Co., Voorheesville, N. Y., now the Voorheesville Castings Co. Inc., died recently at his home near Albany.

* * *

Allen Ames, 82, vice president and general manager, Ames Iron Works, Oswego, N. Y., at the time of his retirement some years ago, died at his home in Syracuse, N. Y., March 31, after an illness of 4 months.

* * *

John J. Enot, founder and president, Enot Foundry Co., Wayne, Mich., died March 27. Mr. Enot during World War I experimented with aluminum pistons and aided in the development of the Liberty airplane motor.

* * *

George J. Graham, 64, Eastern sales manager with headquarters in Philadelphia, Werner G. Smith Co., Division of Archer-Daniels-Midland Co., Cleveland, died recently in Baltimore. Mr. Graham was born in Mercer county, Pennsylvania and attended Allegheny College. He was in Mexico from 1902 to 1910 and was manager of the Ampco Mining Co. In 1910 he became connected with the Hunter Pressed Steel Co. as sales manager, and from 1919 to 1924 was with the Swan & Finch Co. as core oil salesman. Mr. Graham was connected with the Werner G. Smith Co. since 1924. He was a member of the American Foundrymen's Association.

* * *

George L. Norris, 76, chief metallurgist, Vanadium Corp. of America, died in New York, April 13. Mr. Norris, one of the pioneers in the development and application of vanadium, joined the American Vanadium Co. in 1909 and remained with the company when it became the

George L. Norris

Vanadium Corp. of America. He was in active service until the time of his death. Mr. Norris graduated from Massachusetts Institute of Technology in 1887. During the first World War, he was chief metallurgist of the Signal Corps, and later as Major, was manager in charge of the Pittsburgh district of the Bureau of Aircraft Production.

* * *

Prof. A. C. Davis, head of the department of experimental engineering, Cornell University, Ithaca, N. Y., died suddenly March 17. Professor Davis graduated as a mechanical engineer from Cornell in 1914. He was a member of the American Society of Metals and the American Foundrymen's Association, serving as a director of the Central New York Chapter. He helped organize the successful Cornell regional conference meetings and served on numerous committees of the A. F. A., taking special interest in sand research work. His special interests included applied metallurgy, materials of engineering, and internal combustion en

gines. During the last war he served as instructor in the U. S. Army School of Military Aeronautics on Engines.

* * *

William H. Griner, 63, foundry consultant and engineer, St. Marys Foundry Co., St. Marys, O., died at his home in Kenton, O., March 20. Mr. Griner learned the molding trade in Kenton and for several years worked in foundries in the Miami valley and in the Northeastern section of Ohio. After spending several years as foundry superintendent for the Champion Engineering & Equipment Co., Kenton, Mr. Griner purchased and operated his own foundry in that city. Mr. Griner sold his business and for 12 years was a foundry consultant with the Chas. C. Kawin Co., Chicago.

* * *

C. Walter Yost, who has long been active in the foundry industry in the Philadelphia district, died March 29. Mr. Yost graduated in chemistry from the University of Pennsylvania in 1910. For many years he devoted his entire time to nonferrous metallurgy with the American Manganese Bronze Co. In that field his splendid work led to the development of new alloys which now are playing a prominent role in the present defense work. Later he was superintendent of foundries, Midvale Steel Co., Philadelphia, where he was in charge of the manufacture of iron and steel castings in addition to nonferrous castings. Mr. Yost then became superintendent of foundries, Philadelphia-Reading Coal & Iron Co., Pottsville, Pa., after which he became associated with E. & G. Brooke Co., Birdsboro, Pa., in the sale and use of pig iron.

Quicker for Victory Is Plant Slogan

Increased production with safety, victory ideas, conservation of materials and tools, and war bond purchases were the essentials of a campaign launched at Hotel Statler, Cleveland, recently by management and employes of the Westinghouse Electric & Mfg. Co. The program is the Cleveland division's answer to Donald Nelson's request for management-labor co-operation in turning out tools of war at the maximum rate.

Under the banner, *Quicker for Victory*, an all out concentration of effort is being made by each employe in his or her daily tasks. Competition within the plant is between departments and standings are based on progress in attaining the objectives in the 4-part program. Each week the standings are posted on a weighted basis and the department showing the greatest increase for 1942 against 1941 will be designated with a life size figure of General MacArthur. Each week the MacArthur award is changed to the high department, but if it remains in one department for 4 weeks, each member of that department will receive a gold filled *Q4V* symbol pin to replace a base metal pin given when the campaign pledge was made.

Committee members include: C. A. Fike, superintendent of the Cleveland plant, and chairman of the committee; D. E. Jenkins, manager of sales promotion; I. A. Yost, manager of engineering, F. W. Pascoe, supervisor of foundry; C. H. Smith, supervisor of time study; E. R. McFarland, plater; D. F. Hooton, toolmaker; Martin Waldbauer, toolmaker; C. C. Woodfill, foundry foreman and P. R. Dillon, spinner.

Cleveland Office

Meehanite Metal Corp. has opened an office in Cleveland located at Cedar avenue and Fairmount. H. A. Reece is in charge.

GATES and RISERS in any metal

in far Less Time with

Tannewitz METAL CUTTING BAND SAWS

Variable Speed

Models to fit Every Need

In addition to our regular High Speed Band Saws delivering over 2 miles of smooth vibrationless saw travel per minute, which have proved so exceedingly popular in automotive and aviation work, the TANNEWITZ line now offers five other models to provide the fastest cutting medium for every foundry need: a 30" machine to provide any speed from 300 to 900 blade feet per minute—a similar machine with 3-step V-belt drive to give 2300, 3100, 4000 blade feet per minute—a 36" machine with 32" capacity under the guide—a model with 48" wheels and one with 52" wheels, operating at 3,000 blade feet per minute for handling extra large castings. Get a line on the TANNEWITZ metal cutting band saw that fits your particular needs. It will save time, step up production and repay its cost dozens of times. Write for full particulars NOW!

THE TANNEWITZ WORKS, GRAND RAPIDS, MICHIGAN

PROTECTING LIFE PROPERTY AND PRODUCTION

(*Continued from page* 111)

SECTION IV

LIMITATIONS OF RECOMMENDED PRACTICES

It must be distinctly understood that these recommended practices and admonitions, which are felt sufficient for continental United States during the present status of the war, are based on the assumption that this area will probably not become an actual warring area subjected to repeated attacks and aerial bombing raids by the enemy.

Continental United States, without a doubt, will be harassed by aerial raids striking at military and industrial establishments in connection with the war effort. It is of utmost importance, therefore, that all co-operate in providing the safeguards to protect American industry.

The difference in cost between suggestions contained in this report, on the assumption that there probably will be no actual warring areas, compared with the maximum of protection provided by industry in war zones like Europe, is very great. An all-out protection policy and program means expensive duplication of utility services, bomb shelters of costly construction, greatly increased full-time assignments of personnel for emergencies, and a multitude of other contingencies to be dealt with, all of which would involve large expenditures for equipment, material, labor and capital needed for our country's all-out war effort.

SECTION V

HAZARD TO BE GUARDED AGAINST

The foundry industry is faced with the problem of protecting itself against sabotage and subversive activities as well as from damage caused by enemy bombs. Importance of recognizing and being prepared for such acts in every industrial establishment cannot be overstressed. A thorough understanding of how to blackout the property and do the job efficiently is essential toward safeguarding the plant against air raids, and it is a duty owed to the other industries and people in the community for their protection.

The property should be efficiently organized to cope with the destructive effects of aerial bombings in order to minimize casualties, prevent the spread of fires and work stoppage.

SECTION VI—VIGILANCE

Unending vigilance should be exercised in safeguarding plant property and the lives of employes, also to prevent any acts that might stop

Code of Practices

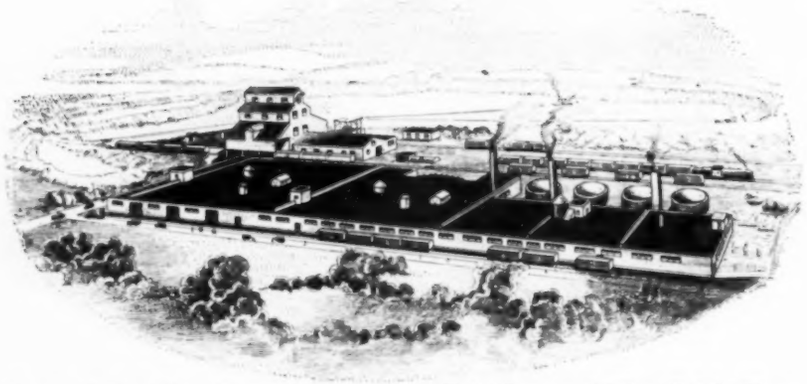
THE code of recommended practices for the protection of life, property and production in the foundry industry during the war, is reproduced in this and subsequent issues through the co-operation of the American Foundrymen's Association, and the industrial hygiene codes committee of that organization.

Since the subject matter covered in this code is of vital importance to every foundry, many undoubtedly will wish to procure the complete report before publication can be finished in The Foundry. The complete code in multigraph form may be purchased through the American Foundrymen's Association, 222 West Adams street, Chicago, for $1.50.

The Editors

GOOSE LAKE

Fire Clay and
Fire Clay Flour
Fire Clay Brick
Therm-O-Flake Insulation



Goose Lake Clay Deposit with Clay Grinding and Fire Brick Plant

Illinois Clay Products Company

JOLIET, ILL.

production or cause curtailment of it, or that might result in the destruction of valuable and strategic materials, tools and equipment.

Vigilance is a very definite function of plant management and its effectiveness down through the plant organization is in proportion to the management's interest in it.

Section VII

Plant Organization for Emergencies

(A)—*Management's Duty.* The management of every establishment should review carefully its individual situation and plan ahead intelligently for emergencies that may arise, so that all details are anticipated in advance and provided for.

These considerations should include the watch service and guarding of the property against unauthorized entry, spying and sabotage; also putting the property in condition for blackouts and making efficient provisions for the handling of emergencies occasioned by aerial bombing by proper organization of employes.

All the careful planning and testing out in advance, of the safeguards provided, will improve greatly the morale of the employes in cases of actual danger, and undoubtedly will be the means of preventing panic, unnecessary injury to the employes and damage to property.

(B)—*Protective Organization for Emergencies.* First step that the management should take is the creation of a protective organization to handle any and all problems pertaining to safeguarding lives of occupants, protecting plant property and maintaining morale.

Large plants employing many, will require a rather complex organization with delegation of duties and responsibilities to quite a number of employes. Size and complexity will, however, depend on number of employes, area of property, number, size and type of buildings, products produced, relation of plant to the adjoining community and importance of product to the war effort.

Fig. 1 shows a typical set-up for a plant protective organization as recommended by the United States Office of Civilian Defense. It contains all essential elements for a medium or large size plant. In the smaller plants the function of the plant protective organization can be consolidated into a much smaller organization. However, duties and responsibilities are the same regardless of the size of the plant, and the plan may be adapted to fit the particular plant.

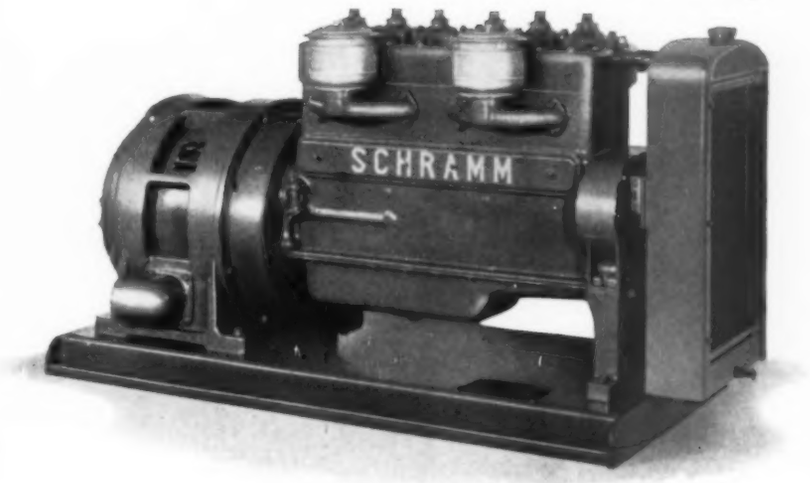
(C)—*Investigation of Plant Personnel.* Management should review the record and history of all employes with the idea of having first-hand information as to their citizenship and loyalty. It should find out and keep a record of employes who are of doubtful character insofar as loyalty is concerned. The Federal Bureau of Investigation can be of greatest help in checking such employment lists, and its aid should be sought whenever obtainable. Advice of the local unit of the Federal Bureau of Investigation shall always be sought in disposing of any cases under suspicion, because it is important in the national welfare.

It is further recommended that all employes be finger-printed under Federal Bureau of Investigation procedure.

(D)—*Identification of Employes.* All employes, including the managerial organization, should be provided with some means of identification consisting of a card or badge indicating the bearer's name, check number, social security number and/or photograph. No employe should be allowed to enter the premises without showing his or her proper identification credentials.

A badge containing a photograph, name and/or check and social se-

AIR *for* *Victory*



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Time is essential and every weapon made today is worth ten next year. Industries are speeding their production up to maximum capacity—more air is needed for expansion and protection against interrupted power service.

Makes no difference if air requirements are in the shop or out in the yards, or where extension of air lines would be impractical and expensive—SCHRAMM Compressors with their superior performance will give you "AIR WHERE YOU NEED IT", instantly—at low cost.

BUILT IN SIZES 20 TO 600 CU. FT. DISPLACEMENT

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curity number of the employe is relatively cheap and it is easy for the watch service to identify quickly a large number in a limited time. Then too, a photographic badge is much more difficult to counterfeit.

(E)—*Plant Visitors.*

(1) *Visitors.* Visitors should not be allowed beyond the reception room of any plant until vouched for, identified, and provided with a pass authorized by someone in authority. Visitors who are passed into the plant should have their hand-bags and brief cases opened for inspection before going into the plant and also upon leaving the property of the company.

Visitors should always be accompanied by some employe when leaving the reception room for any part of the plant or property and he should be allowed to visit only that part in which he has business.

The visitor's pass should be picked up when he leaves the premises.

In case of a visitor's requesting permission to see actual ordnance work in progress, such visitor shall have a letter from the Plant Protection Section of the Local Ordnance District of the War Department in charge or equal authority from some other recognized department of the government.

A permanent record should be kept of all visitors so that the record can be reviewed by anyone in authority.

(2) *Tradesmen.* Tradesmen who enter the plant regularly or those who operate concessions within the plant such as cafeterias, lunch wagons, water and soft drink deliveries, should be investigated thoroughly by the plant management before being given permission to enter the plant; and they should be provided with identification badges to be used during the time they are on the plant property.

(3) *Utility and Governmental Representatives.* Representatives of utility companies or governmental departments such as meter readers, service men, factory, health, boiler and smoke inspectors, telephone repair men, insurance inspectors and the like, should be required to show their credentials before going into the plant, and they should be accompanied through the plant by someone from the plant personnel.

(F)—*Plant Defense Co-ordinator.*

(1) *Selection.* A plant defense co-ordinator should be selected and given complete charge and supervision over all the plant protection divisions consisting essentially of four groups, viz., fire, police, medical and maintenance. He should have the necessary qualifications of leadership, knowledge of the plant and its construction, and engineering ability to command the confidence of the whole plant. In some plants because of size or layout, it may be desirable to set up the wardens as a separate division.

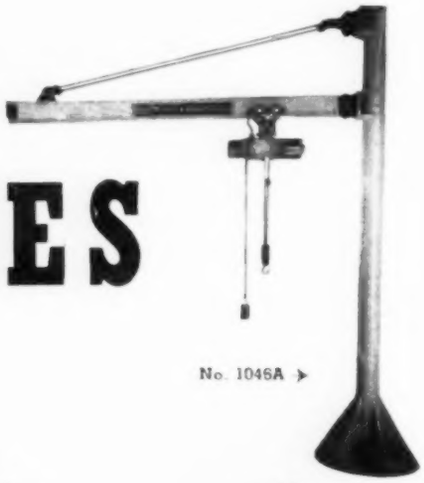
(2) *Duties.* The co-ordinator should have the task of organizing the various divisions under him or, if certain groups are already in existence, taking over supervision of them and training these groups in the new tasks that they may be called upon to cope with.

During times of emergency the plant defense co-ordinator should be in complete charge, and all division groups should be responsible to him at all times.

(3) *Multiple Shift Operations.* Plants operating multiple shifts should provide for a plant defense co-ordinator for each shift so that emergencies may be handled any hour of the day, 7 days of the week.

When more than one plant defense co-ordinator is involved, because of multiple shifts, one of the two or three involved should be given ranking supervision over

JIB CRANES



No. 1046A ▸

NEW PILLAR TYPE—No. 1046A

■ A self-supporting crane with 220 degree swing. Capacity up to one ton with 12' radius. Furnished with hand or electric hoist, as required.

NEW!
by Chicago Tramrail

No. 1044 ▲

■ Easily and quickly installed in your foundry to speed up production. CHICAGO jib cranes, constructed in our own plant to your specifications, are unusually well-made and moderately priced.

WALL TYPE—No. 1044

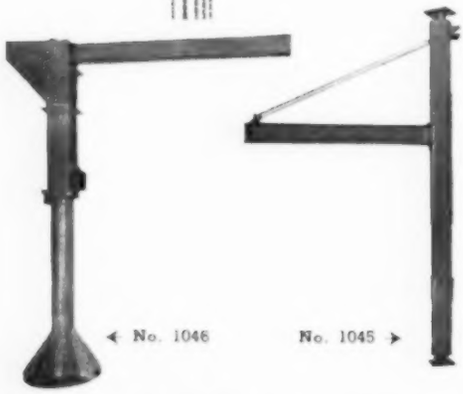
■ This swinging bracket jib crane is a popular unit. For hand or electric hoist, it comes in capacities of ½ to 3 tons and up to 20 ft. radius.

MAST TYPE—No. 1045

■ Ideally suited for capacities to 5 tons. For either hand or electric hoist. Complete circle swing. Made for your requirements.

PILLAR TYPE—No. 1046

■ A strong unit with self-supporting jib crane with complete circle-swing. Capacities ½ to 2 ton with 20 foot radius. Built to last.



◂ No. 1046 No. 1045 ▸

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the entire plant program so that there will be no misinterpretation or confusion as to requirements and activities.

(4) *Plant Defense Co-ordinator's Office.* An office that is considered the safest location in the plant, supplemented by additional protection if deemed necessary, should be provided. There should be outside telephone connections with his office as well as inter-plant battery telephone connections with the boiler and power houses, substations, fire watchers' observation posts and all strategic areas. Two-way battery operated radio communicating systems may be substituted for the plant telephone systems. In the event of failure of the telephone or radio system for inter-plant communications, messengers or runners should be available as means of contact. For long distances, bicycles should be provided for the messengers.

A.F.A. Elects Six Directors

(*Continued from page* 132)

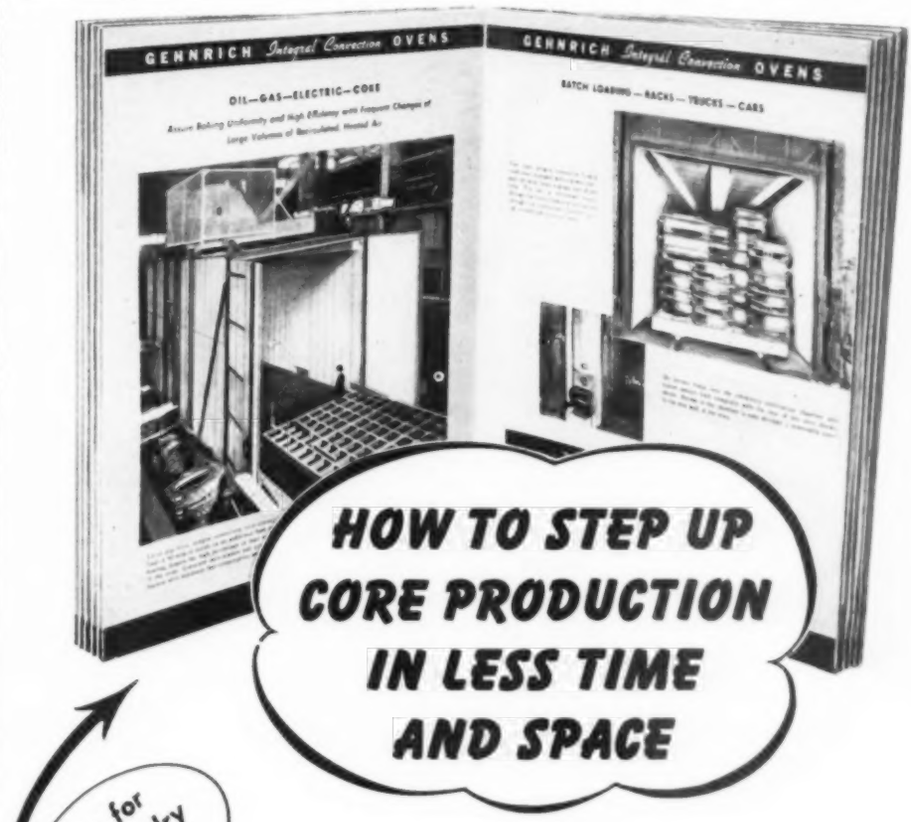
Co., Philadelphia as an analytical chemist and later became chief chemist, Midvale Works, Wilmington, Del. In 1918 he became identified with the inspection division of the ordnance department, established checking laboratories at various plants and in 1919 moved to the Watertown arsenal as metallurgical chemist. In 1920 he became metallurgist and chief inspector, Electric Steel Castings Co., Indianapolis and 2 years later was appointed vice president and general manager. Besides his work with the A.F.A. he is an active member of the Steel Founder's Society of America.

Sheldon V. Wood

SHELDON V. WOOD, a member of the Steel Division Advisory committee of the association, was active in the work of the Twin City Foundrymen's Association and had an active part in the formation of the present Twin City chapter of the A.F.A., of which he is a member of the board of directors. He was born in Jefferson, Ia., where he received his preparatory education, and he was graduated from the university of Minnesota in 1904 with an engineering degree. For 2 years he was an engineer with the Great Northern railroad. Later he was an engineer with the Seager Engine Co., Lansing, Mich. In 1913 he opened a consulting office in Minneapolis and in 1913 joined his present company. He is a member of the American Foundrymen's Association, American Institute Mechanical Engineers, American Society of Metals, Steel Founder's Society of America and the Minneapolis Engineers Society. He has been active in University of Minnesota affairs and now is serving as a members of the Board of Regents.

Vaughan Reid

VAUGHAN REID, president, City Pattern Works, Detroit, was born in Dundee, Scotland and attended the science and art technical schools there. From 1900 to 1905 he served a regular pattern making apprenticeship in the Camperdown Jute Works, and then joined the Anchor Line Shops in Glasgow. His first position after leaving Scotland was with the Allis-Chalmers Bullock Co., Montreal, Que. He then joined the Detroit Steel Casting Co., Detroit, and from there went to the Packard Motor Car Co., where he was an inspector for 4 years. His next connection was with the Michigan Malleable Iron Co., Detroit, as master mechanic. The City Pattern Works, Detroit, was organized in August, 1913, and Mr. Reid has been president of the company since its founding. He is general chairman of the patternmaking division of the A.F.A., and has served as chairman of the Detroit Chapter of that organization. When the A.F.A. held its convention in Detroit in 1936, Mr. Reid was the general chairman.



HOW TO STEP UP CORE PRODUCTION IN LESS TIME AND SPACE

Write for this Foundry Oven Book

This book tells how Gehnrich Integral Convection Ovens make possible baking of large loads of cores and molds more uniformly. The exclusive Gehnrich integral convection heating and heat recirculation system applied to Gehnrich Dual Panel Oven construction saves heat, time and fuel and strengthens the cores.

Dozens of Gehnrich installations handling from 1 to 100 tons of sand per load are cutting baking time in less space and are pushing along their end of urgent war production. We'll gladly send you this book, and a list of Gehnrich Oven users. Let them tell you what they think of Gehnrich Oven performance. The Gehnrich Corporation, 42-11 Thirty-fifth St., Long Island City, N. Y.

GEHNRICH INTEGRAL CONVECTION CORE OVENS

PLANNING MAINTAINS QUALITY

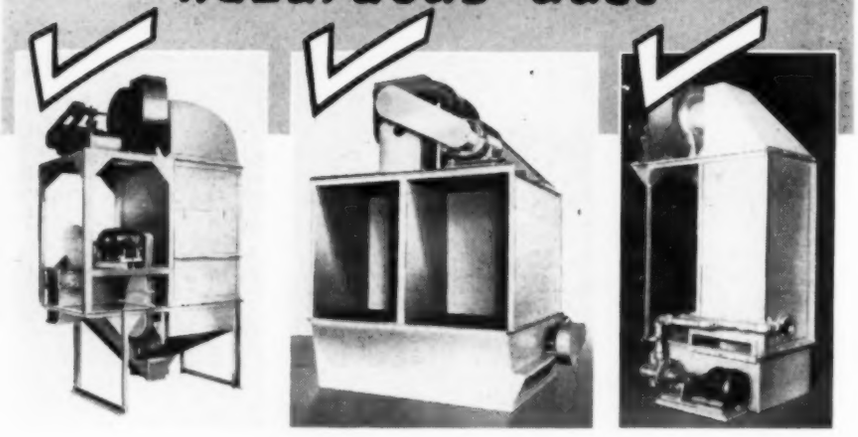
(*Continued from page* 109)

this foundry has three molding units and a sand-slinger. All the molds are bottom poured as in Fig. 3. To offset a costly change of patterns on a molding unit for just a few molds, the jobs are rammed up under the sandslinger. The slinger work is arranged in a half of a 24-foot diameter circle as the head of slinger can swing only 180 degrees. However, the vertical height, that is distance from the slinger head to floor level or the top of the mold being rammed can be varied, as the slinger head is moveable in the vertical plane. This permits a varied height of molds to be rammed. All the larger molds are air dried over night and closed the following day, thus permitting the sand to peel off the casting easier. A large percentage of the miscellaneous steel castings are double reversed and a freedom from hot tears and shrinkage cavities is the result.

The coreroom has two vertical, oil fired tower ovens. Sand is mixed in the basement and taken by an elevator to an overhead cat walk. Here the core sand is delivered by a push cart to a bin directly above the coremaker. Coremakers work along a mechanically driven rubber belt which delivers the green cores to the oven, as shown in Fig. 5. The oven cycle can be varied according to the moisture of the core sand, amount of oil and binder used. Average cycle of these ovens is two hours and ten minutes. The larger work makes two complete trips before being taken off the core racks and placed on roller conveyors. Cores requiring pasting are pasted immediately while hot, so very little extra heat is required after pasting. As the cores go down the rollers they are cleaned, sorted and packed in boxes ready for delivery to the foundry.

Small castings, after they have been stamped with heat number in the cleaning room, are cleaned by a variety of cleaning equipment. One such unit is shown in Fig. 10. Heads and gates are then cut off and the good castings are placed in annealing baskets ready for heat treatment and stress relieving that is required. After this heat treatment, the castings are chipped and ground. One of the final operations, after the castings have their final inspection, is to give them a shot blasting so that the castings go out to the customer in the best appearance possible.

If you process Magnesium you need a Hydro-Whirl to make safe disposal of the hazardous dust



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Problems of Credit

"Credit Problems in a War Economy" is the title of a recent booklet prepared by Roy A. Foulke, manager, Analytical Report Division, Dun & Bradstreet Inc., 290 Broadway, New York. The text discusses the problem of the nonwar product manufacturer in his efforts to finance his business against a dwindling source of supply, and the war-product maker who is frequently burdened with heavy liabilities. Included in the discussion are tables which give balance sheet and operating ratios for 78 lines of business. Information on ratios for foundries is included.

Firm Reorganized

Monarch Engineering and Mfg. Co., Baltimore, recently has been reorganized with the following officers: Donald D. Cooke, president, Gordon Cooke, vice president, John Whitridge, secretary-treasurer. William Chenowith, who has been connected with that organization for many years, remains as superintendent and chief engineer. Numerous plant improvements are contemplated.

INCREASING FOUNDRY PRODUCTION

(*Continued from page* 107)

The cupola charge contains a large percentage of steel scrap, generally around 90 per cent. This steel scrap can be of most any type if the size, mass and chemistry are associated with the size of the cupola and permit the chemistry of the product to fall within specifications. It would include, rail, springs and other railway scrap, structural shapes and plate, bundled strip steel, gates, risers, etc. Fuel used in the cupola need not be more than 115 to 120 pounds of coke per 1000 pounds of metal. The chemistry of the cupola product should be about 2.75 per cent carbon, 0.6 per cent manganese, 1.3 per cent silicon with phosphorus below specifications. Sulphur is reduced by batch desulphurization in the ladle with fused sodium carbonate or crude sodium hydroxide and sodium carbonate. About 30 pounds of fused sodium carbonate per ton of metal treated is used to effect an 0.04 per cent sulphur reduction in an 0.10 per cent sulphur iron, provided the batch desulphurization method is used and sufficient but not excessive time employed in the operation. The desulphurizing operation takes place between the cupola and the converter. The need for desulphurization is dependent on chemical specifications for the final product.

Variables Affect Metal Loss

Metal loss from the amount charged into the cupola to the amount poured from the converter is 12 per cent or higher. Variables include chemistry of charge and cupola product, skill in converter operation, and condition of beginning materials. Large castings may be poured in single converter installations by accumulating metal from 2 or even from 3 heats. When there is a battery of two or more converters, large quantities of metal may be accumulated quite easily.

Favorable factors of the process are high speed, low capital investment, low power consumption per ton of output, and possibility of tying in batch metal processing with continuous molding systems, etc. The unfavorable factors are greater loss of metal and metalloids than in other processes, lower acceptance of product than other processes, process essentially limited to acid practice (except insofar as recently developed methods of phosphorus reduction in acid practice prove applicable), etc.

As the open hearth process is a refining or conversion process quite similar to the bessemer process except that reaction rates are much slower (what takes place in converter operation in a few minutes—takes hours in open hearth operation), the combination of two furnaces is again possible. It is possible to combine cupolas and open hearths but on a slightly modified principle. In the converter process all of the cupola metal passes through the converter but in the cupola-open hearth process only 25 to 40 per cent of the open hearth charge is cupola metal. It is almost identical to the practice of adding blast furnace metal in open hearth practice. When the cupola is used the composition of the hot metal varies with the type of scrap charged in contrast to the fairly well predicted analysis of blast furnace metal. The cupola-converter-open hearth combination also may be used.

The malleable division of the foundry industry has used air furnaces (reverberatory type) almost exclusively for 100 years, except for the cupola melted grade of malleable. Some 10 or more years ago an important change began in this division of the foundry industry in which melting became a duplexing

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RAY P. SCULLY, *Vice President*

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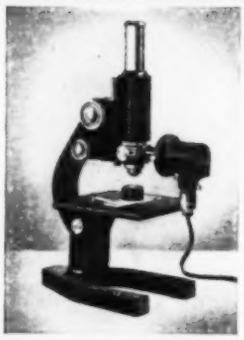
operation. The first important tonnage producer combined cupolas and electric furnaces, a process in which some adjustment of the cupola composition was made in the electric furnace by the addition of cold metal. This process was expanded to the point where one foundry using this method melted as much as 1400 tons of metal per day. However, the general change was toward a duplexing process, involving cupolas and air furnaces.

The malleable foundry using only the air furnace can melt only one or two heats a day. As an average air furnace has a capacity of 15 to 20 tons, this meant a daily melt up to 30 or 40 tons per furnace. Addition of a cupola to an air furnace multiplies this maximum single furnace output about three times, so instead of 30 to 40 tons per day, the output is stepped up to 90 to 120 tons per day. It is not essential that a duplexing system, which basically means a continuous supply of useable metal at all times during the working day, be synchronized with conveyor or continuous molding, as some duplexing systems are being operated in foundries with floor stor-

"for technical control"



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age of molds. However, the maximum harmony between molding and melting, and consequently the greatest output, is obtained with continuous molding.

Fuel for air furnace operation includes pulverized coal, oil or lump coal for hand firing. Duplexing fuels are coke and pulverized coal. Coke was a new fuel to the malleable foundrymen. As the malleable division of the foundry industry was not acquainted with cupola operation, except for that small portion of the industry which produced the cupola grade of malleable, it had the problem of becoming skilled in the use of that type of furnace. This was and still is more of a chore than many malleable foundrymen realize.

Materials used to make malleable iron by the duplexing process are significantly different from those used in air furnace production. Coke is now used as a melting fuel whereas its former use was limited to non-metallurgical jobs, such as core oven fuel. The iron charge in the cupola now contains 20 to 40 per cent steel scrap whereas the air furnace charge contained no steel scrap, or at most a very small percentage. Greater use of steel has reflected in a need for silicon in concentrated form, such as high silicon pig iron, silicon briquets, etc. The added sulphur contamination in cupola melting either has upped the quantity of manganese required or has made it necessary to desulphurize between the cupola and the air furnace.

Learn Other Methods

Earlier in this discussion it was suggested that foundrymen would do well to acquaint themselves with the operations of other divisions of the foundry industry. Better acquaintance with gray iron problems, specifically with cupola operations, would have enabled the malleable foundrymen to solve the duplexing problem more easily.

Success in duplexing malleable is dependent on producing uniform carbons in the cupola metal. The lower the carbon is maintained, the lower are requirements for coke, steel scrap and silicon. There is a further lowering of carbon in the air furnace of some 30 to 50 points. A normal cupola charge in a duplexed malleable operation could consist of the following: 55-60 per cent sprue and malleable scrap, 20-22 per cent steel scrap and 20 per cent pig iron. With this charge the cupola iron would have 2.7 to 2.8 per cent carbon. Iron from the air furnace would contain 2.3 to 2.4 per cent carbon.

Some malleable iron is still made in the rotary, open hearth and air furnaces but practically all of the large producers are duplexing. About 3,000,000 tons of metal is being melted in malleable foundries this

year. Before leaving this brief discussion of production methods in the malleable division of the foundry industry I would like to say that I believe a first quality malleable can be made directly in the cupola.

A number of years ago the cupola was being developed as a melting furnace in nonferrous foundries, particularly, for the tin bronzes, or lead bronzes containing less than 10 per cent lead, and for low zinc brasses. Some of the large nonferrous foundries use cupolas successfully on specific types of nonferrous metals. Some large gray iron foundries use the cupola for the 88-10-2 type of bronze. As the cupola is an extremely high speed melting unit most of its use in nonferrous melting has been with cupolas 20 to 24 inches inside diameter. In the past, where the nonferrous foundry capacity had to be increased, another cupola was purchased so that at present some foundries operate 4 to 5 small cupolas. The author was surprised to learn recently that a new foundry for nonferrous melting anticipated installing 4 or 5 small cupolas to attain the required tonnage. The man I talked with seemed surprised that larger diameter cupolas (above 24 inches) were adaptable to bronze melting. The cupola can be a satisfactory melting medium for some of the copper base nonferrous metals and the maximum size furnace which may be used is determined mainly by the hourly or total quantity of metal required.

Melt Large Tonnage

If *all* of the cupolas now installed in foundries of the United States were operated at one time, 8 hours per day and 250 days per year, the total tonnage produced would be greater than the tonnage now being produced in the whole steel industry. I do not want to infer that we actually have a capacity of that order, for some foundries operate cupolas on alternate days and one blower may serve two cupolas. Again a small cupola now installed in a foundry making heavy castings would be of questionable value, etc. However, actual cupola melting capacity, after the theoretical capacity is corrected for all types of contingencies, is still far greater than the producers of gray iron have needed. However, it would be found that one foundry has more melting capacity than necessary and another has less. This would require reallocation of some equipment to be of maximum use.

Hourly melting rate or hourly capacity of any cupola is dependent on several factors. That cupola which produces more heat per square foot of cupola area will melt more metal per given unit of time, whether this time unit is a minute, or an hour or a day. Since the oxygen content of air combines with the carbon content of coke to generate heat, an increase in the air supply to any size cupola will be reflected in an increased melting rate. This statement is not wholly true unless qualified with the statement that under both operations the same thermal efficiency prevails. Thermal efficiency means the heat content of the iron melted by one pound of coke compared to the theoretical heat content of one pound of coke when burned in perfect combustion. The thermal efficiency in cupola operations may range from under 20 per cent to more than 65 per cent. Some heat is used to melt slag, to heat the refractories, and some is lost in radiation through the shell, in the hot gases escaping up the stack, through the slag hole, etc. Some heat is not made available from coke which is burned in incomplete combustion. But when all these sources of heat loss are summed up, and they total only 30-40 per cent of the theoretical amount present, the cupola must be considered a highly efficient process.

In most cupola operations some carbon is dissolved by the metal, so that the carbon content of the metal tapped from the cupola is much

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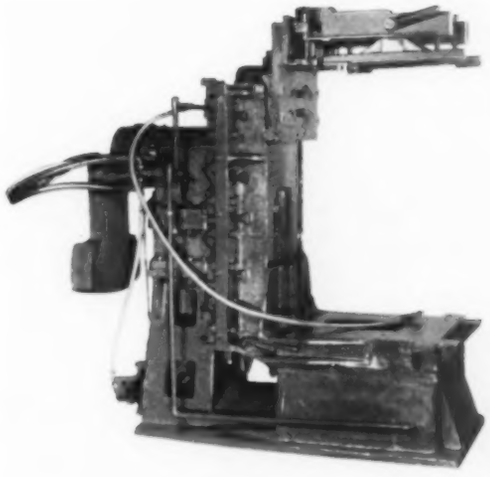

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higher than the carbon content of the charge. In some operations, particularly in those in which high carbon is desired (above 3.6 per cent) sufficient coke is used to saturate the metal with carbon. To distinguish between the coke that takes part in the thermal reactions and that which is dissolved by metal the term *apparent fuel ratio* is used to mean the ratio between metal and coke as actually charged, while *actual fuel ratio* credits the fuel charge by that amount dissolved by the iron.

Carbon content of the charge, on an operation I am associated with at the present time, is 2.1 per cent, while that of the tapped metal is 2.8 per cent. This increase of 0.7 per cent carbon is equivalent to 14 pounds of carbon per ton of metal and with a coke of 90 per cent carbon, the 14 pounds of carbon is equivalent to 15.6 pounds of coke. The fuel charge is 155 pounds of coke per 2000 pounds of metal. Of this fuel charge, 15.6 pounds is dissolved by the metal. Therefore, the apparent fuel ratio is 12.95 to 1 and the actual fuel ratio is 14.4 to 1. This is an operation making duplexed malleable iron in which a 48-inch cupola is used. The daily melt approximates 150 tons. The metal temperature at the cupola spout is 2750 to 2800 degrees Fahr.

Computation of the thermal efficiency of a cupola need not be made a cumbersome thing provided one is satisfied with a reasonably accurate knowledge of this value in contra-distinction of no knowledge whatever. The heat content of a pound of molten iron issuing from the cupola is close to 600 B.t.u. The theoretical heat value of a pound of carbon is close to 14,000 B.t.u. Metallurgical coke is about 90 per cent carbon so the heat units in a pound of coke are 90 per cent of 14,000 or 12,600 B.t.u.

When the actual fuel ratio is 14.4 pounds of metal per pound of coke as previously mentioned, the heat content of 14.4 pounds of coke at 600 B.t.u. per pound is 8640 B.t.u. and that of one pound of coke 12,600 B.t.u. Thus, the thermal efficiency would be 8640 divided by 12,600, or 68.5 per cent. This figure of 68.5 per cent might not stand the critical audit of combustion engineers but there is no doubt that the efficiency is of the order of 60 per cent or more, which is the useful tool being suggested.

Increase Melting Rate

To increase the melting rate of the cupola by using more air presumes that the blower has some reserve capacity, that it may be speeded up, or that air loss between the blower and the cupola melting zone can be eliminated. These achievements generally are possible. Improving the melting rate by striving for the utmost in thermal efficiency incorporates some fundamental principles which we cannot ignore today. Though an improved thermal efficiency is actually conservation of fuel of metallurgical quality, it is probably the least significant of the ends attained. Quality of the cupola product stands to be upgraded and the variations in quality narrowed. It offers the greatest latitude in selecting materials for the cupola charge and permits the greatest conservation in the use of steel scrap and silicon bearing materials. Should the day come when an air raid warning requires the *blacking out* of an operating cupola, it will be much easier to black out one that transfers most of the available heat units in the fuel to metal than one doing everything possible to heat up the whole outdoors. Basic principles involved are as follows: (1) To upgrade the quality of the cupola product; (2) To conserve strategic materials including coke, steel, scrap, silicon; (3) To provide economies in operation, both in fuel and in metal charge; (4) To improve safety conditions during danger periods. One or all of these reasons should be the challenge that will

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cause every foundryman to study and improve cupola operations.

I believe the gray iron division of the foundry industry should conserve steel scrap simply because the steel castings division of the foundry industry or the steel industry itself can put this type of scrap to better use. As steel scrap is deficient in silicon, each ton of steel used in the cupola requires approximately 40 pounds of silicon for replenishment. Conservation of fuel works toward conservation of steel scrap and the conservation of steel scrap works toward the conservation of silicon.

How does one go about improving the thermal balance of the cupola? It would be well not to change anything until after making a bona fide check of cupola operations. If the daily operating records do not reflect facts, correct these records so that they do. This will establish a true base on which future improvement can be built. Next it is essential that coke charges be *weighed accurately.* Neither forking coke or volumetric measurement of coke is satisfactory practice if the full possibilities of the cupola melting unit are to be explored.

Coke Charges Vary

Accurate weighing should be associated with a preferred weight unit. For example, I have seen cupolas lined to 72 inches operated with coke charges as small as 100 pounds and as large as 1000 pounds and at all stages in between. The preferred coke charge of a 72-inch cupola is of the order of 215 pounds and a charge of that weight or one of less weight would be preferred to one weighing more. The weight unit for any cupola could be 7.5 pounds of coke per square foot of cupola area, or even less, to as low as 4.5 pounds. Weight units usually used range from 15 to 30 pounds of coke per square foot of cupola area.

Foundry metallurgical cokes differ somewhat in characteristics and in size. Therefore, in addition to accurate weighing and the use of a preferred weight unit, it is desirable to use a size reasonably related to the size of the cupola and a type of coke best suited to the type of iron produced. A good coke size is about 1/12 of the cupola diameter. I know of a 60-inch cupola being operated successfully on coke of 1 to 2 inches in size. It is unlikely that any coke would be equally satisfactory in producing a high carbon iron of 3.6 to 3.8 per cent carbon and a low carbon iron of 2.6 to 2.8 per cent carbon, so the type of coke best suited to the job at hand should be used.

While this discussion has emphasized the importance of the cupola, it should not be inferred that all methods of increasing production of the ferrous metals are tied in with the cupola. However, I very definitely hope to impress the reader with the increasing importance of the cupola throughout much of the foundry industry and to a lesser degree in the steel industry. A great many electric furnaces have been installed in steel foundries and in steel mills during the past few years to increase capacity. I have not emphasized this method of increasing production because there is some limit to what a builder of furnaces can turn out and to what power companies can generate in power. Rotary furnaces, which were introduced in this country some years ago, have been used in certain types of cast steel and malleable.

Subcontracting

Problems pertaining to conversion and subcontracting are discussed in some details in a recent 115-page booklet entitled "Producing For War," published by the Research Institute of America, 292 Madison avenue, New York. The text discusses such problems as the proper places to go to secure war work, financing war work, obtaining subcontracts, farming out work, maintaining a labor supply and methods of improving operations. The publication may be obtained from the institute at the above address for $2.00.

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INSPECTING CASTINGS FOR AIRCRAFT

(*Continued from page* 104)

is checked quickly and easily by a direct dial reading on modern hardness testing machines set at 1000 kilogram load. From 10 to 20 castings can be tested per minute.

It is vitally essential that the following facts be known before castings can be molded on a production basis. Will each individual part have sufficient extra material for machining only at the surfaces where necessary; are all wall thicknesses, radii, and fillets as specified on blueprints; are bosses and pads correctly placed to insure proper spacing of holes, bearing bores, etc.

Many such castings require 20 or more machining operations. It could be very costly to find, upon the completion of the job, that, owing to the lack of sufficient stock or the misplacing of a pad or boss, the entire order of castings was defective and had to be scrapped.

To prevent this occurrence, an outlined procedure is followed. The pattern, which was made to blueprint dimensions with allowances for proper shrinkage, is used to make a sand mold and this is filled with molten metal to make a casting. The sample casting, after being snagged and cleaned, is sent to the inspection department for layout purposes.

During inspection the casting is painted with blue layout ink to make all scribed lines clearly visible. It is then clamped to an angle plate or parallel block which is placed on an accurate surface plate. The inspector proceeds to square the theoretical or working center lines parallel and perpendicular to the face of a surface which will not be machined. With the aid of the surface out gage needle used as a feeler, the casting is adjusted by means of small jacks or other accessories, until this surface is truly parallel with the face of the surface plate. The block is then turned over 90 degrees so that the part which was perpendicular is now parallel to the plane surface and the operation is repeated until all planes are squared.

Determine True Centers

With the use of a height or surface gage, the true centers are determined and scribed into the casting. Then, working up and down from the center line, the dimensions of the blueprint are taken one by one and transferred to the casting. This is done in three different planes.

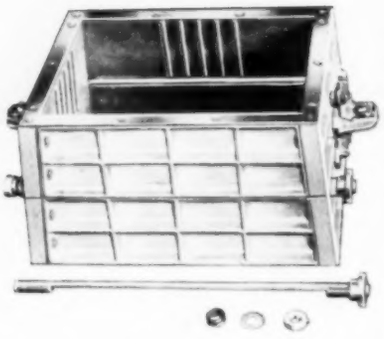
After dismounting the castings from the angle block, a pair of dividers is used to scribe the various circles representing the drilled holes, bores, etc. At this point it easily becomes apparent what surfaces have too little or too much material and corrections can be made on the pattern. This is repeated on new castings until the sample part meets all specifications.

It is necessary to permit a dimensional tolerance varying from 1/32-inch on unfinished surfaces of medium size sand castings to slightly less on small parts and somewhat more on very large castings. This allowance normally is required in manufacturing this type of product.

This requires a very high degree of skill and a sound knowledge of foundry practice. A taper of approximately ⅛-inch to the foot must be allowed to facilitate removal of the pattern without disturbing the sand. The pattern is made to conform to specifications but must be built slightly larger to allow for the shrinkage of the metal in cooling. When the mold is rammed, the pattern is withdrawn manually or with the aid of a vibrator. The cores are next set and anchored in their proper relation to wall thick-

Announcing the New

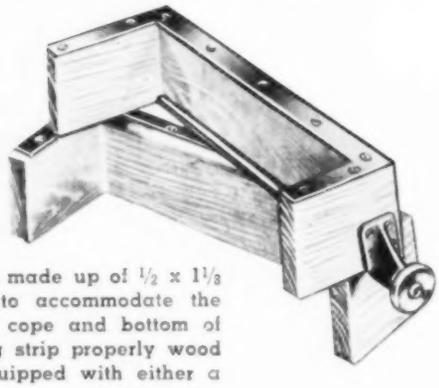
CMD TAPERED SLIP FLASK



The photo illustrates the CMD SLIP FLASK with one sand support strip assembly removed. It will be noted that the sand strip is milled half round and is intended to rest snugly on pattern plate when cope is being rammed.

Two new features are incorporated in the new CMD TAPERED SLIP FLASK. The streamlined sand support arrangement is the last word in supporting the sand in the cope when lifting so that pattern may be drawn. Further, when closing cope, mold is transferred to floor, the stripping of flask is simply done by a quarter turn of the sand strip turn-knob located on opposite ends of cope. It will be further noted that the cope has five vertical ribs on each side and ends. These ribs will leave a vertical groove in cope which is intended for the purpose of relieving gases discharged at the parting. By this feature, jackets can be made to fit the mold snugly.

CMD WOOD SLIP FLASK



In view of the crisis with which we are confronted today, all foundries realize the importance of substituting the products that are on the critical list. It is for this reason that we designed the new CMD SLIP FLASK made of white oak lumber having a dimension of 1⅛ full thickness—note the locked-corner design. The parting of cope and drag is made up of ½ x 1⅛ cold rolled stressed free steel to accommodate the sand support strip. The top of cope and bottom of drag has ⅛ x 1⅛ steel wearing strip properly wood screwed. This flask can be equipped with either a straight "V" or a Buckeye pin.

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nesses, etc. with the use of core prints. The cope and drag are then put together to complete the mold. Owing to these various manual operations, it is not possible to manufacture a product with the precision possible on a screw machine, lathe, etc.

Confronted with these possible variations, it is necessary to give the utmost attention to the inspection of the castings. Indicating calipers are used to check for uneven wall thicknesses. Many types of special shaped calipers are used and some of them are equipped with tungsten carbide points to prevent excessive wear from rough castings. On very thin wall sections it is necessary to use calipers on which a dial indicator, graduated in thousandths, is mounted because normal tolerances would not be permissible. Some castings require inspection with alignment fixtures and special gages to check for possible distortion or warpage. Straight edges are employed to check for excessive snagging at gates, risers and parting lines. Castings are checked 100 per cent visually for apparent core or flask shift, shrinks, tears, cracks and sand holes.

America's supremacy in aviation must be maintained, and only through vigilant inspection of all materials will we have positive assurance of satisfactory performance in aircraft equipment. In this way we will help promote our national defense.

Form Committee for Sanitary Ware

Sanitary cast iron and formed enamelware subcommittee of the plumbing and heating advisory committee, War Production Board, was formed recently. Committee members are: M. L. Ondo, Youngstown Pressed Steel Division, Mullins Co., Washington; C. A. Ferguson, Maryland Sanitary Mfg. Co., Baltimore; W. G. Moore, Humphreys Mfg. Co., Mansfield, O.; E. O. Brady, Briggs Mfg. Co., Detroit; J. M. Carbeau, Ellwood Co., Ellwood City, Pa.; C. C. Adams, Richmond Radiator, Uniontown, Pa.; T. M. Hodges, U. S. Sanitary Mfg. Co., Pittsburgh; F. P. Uphues, Crane Co., Chicago; Thomas J. Hannah Jr., American Radiator & Standard Sanitary Corp., Pittsburgh; C. A. Morrow, Mullins Mfg. Co., Warren, O.; R. R. Crane, Eljer Co., Ford City, Pa.; C. L. Stoup, Auburn Central Mfg. Corp., Connersville, Ind.; A. G. Zibbell, Kohler Co., Kohler, Wis.; H. C. Beresford, Murray Corp. of America, Detroit; H. J. Held, Rundle Mfg. Co., Milwaukee; Louis Probst, National Sanitary Co., Salem, O.; James M. Bonner, Washington-Eljer Co., Los Angeles; R. R. Trubey, Davidson Enamel Co., Clyde, O. Walter W. Timmis, chief of the Plumbing and Heating Branch, is government presiding officer.

Machine Tool Branch Forms Committee

A machine tools industry advisory committee, War Production Board, recently has been organized. Committee members are: H. S. Beal, C. B. Cottrell & Sons, Westerly, R. I.; A. G. Bryant, Cleereman Machine Tool Co., Green Bay, Wis.; Ralph W. Burke, Kearney & Trecker Corp., Milwaukee; Ralph E. Flanders, Jones & Lamson Machine Co., Springfield, Vt.; A. K. Ingle, Consolidated Machine Tool Corp., Rochester, N. Y.; R. F. Ingram, Landis Tool Co., Waynesboro, Pa.; George H. Johnson, Gisholt Machine Co., Madison, Wis.; T. S. Ross, Rivett Lathe & Grinder Inc., Boston; W. W. Tangemen, Cincinnati Milling Machine Co., Cincinnati; R. J. Whiting, Hydraulic Press Mfg. Co., Mt. Gilead, O.; J. F. Miller, Ex-Cell-O Corp., Detroit. George Brainard, chief of the Tools Branch, is government presiding officer. Effort of this committee, will facilitate co-ordination and increased production.

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CASTING PLOW PARTS AND PIPE FITTINGS

(*Continued from page* 103)

foundry parlance it is undercut. Therefore if attached rigidly to the main body of the pattern, it would be impossible to lift the sand. To offset this contingency the flange on the pattern is made separately and works through a suitable slot provided in the pattern plate for the purpose. The flange is connected under the pattern plate with a toggle and lever device which strips it out of the mold before the flask is lifted. A sand frame shown standing at the back is set on the flask to hold the extra amount of sand required before the squeezer head is brought down. The squeezer head is not flat, but the surface conforms approximately to the shape of the patterns. This feature obviates the danger of squeezing the sand too hard over the high parts of the patterns. The usual day's work is 200 flasks, or 400 castings. Average discount is 2 per cent.

Joints Are Planed

Cast iron flasks with ½-inch walls are planed on the joints top and bottom to insure uniform operating conditions. The flasks are not barred and the machines are adjusted to ram them all alike. Any variation in height would affect the density of the rammed sand. This feature and all others connected with this apparently simple job are closely controlled. Another reason for planing the flask joints is because the molds are stacked five or six high and poured in that position. The drag serves as a cover and weight for the mold immediately below. It is essential that flasks and molds sit snugly on top of each other to prevent the static pressure of the iron from forcing the sand through the copes with consequent swelling of the castings to more than the proper thickness.

Flasks conform closely to the shape of the patterns and are of minimum depth. These two features effect a material saving in the amount of sand. Each cope carries a small extension or pocket at one end to serve as a pouring basin. Pouring basin and sprue are formed at the same time and by the same action which rams the mold. When the squeeze lever is released the molder lifts the drag from the machine and sets it down either on a plate if it is the bottom of the stack, or on top of the preceding mold. A lever releases the flange by drawing it down through the stripping plate.

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The cope then is lifted from the machine and placed on the drag. The toggle lever is reversed to push the pattern flange up into its places.

Although the molds are stacked six high, they are poured individually. A rail paralleling the row of molds extends over each floor. Iron is conveyed from the cupola in a large ladle suspended from a crane. At the gangway the bull ladles are filled from this large ladle. Each bull ladle manipulated by a single operator is attached to a small hoist suspended from the monorail. This feature is shown in Fig. 4. The ladle is held at one level until all the molds at that level are filled. It is then lifted a short distance and the next lowest row is poured. This method prevents any drops or splashes of iron from falling into the lower sprues, as conceivably might happen if pouring commenced at the top. The contingency is possible, but rather remote. Ladle men are fast and skilful.

Drags Are Chill Plates

Each molder pours metal into his own molds, but the molds are shaken out by a special crew which stacks the empty flasks, pulls out the castings, piles them near the gangway, retrieves and oils the chills at a convenient point for the follow-ign day's operation.

Methods and rigging employed in making the plow mold boards are shown in Figs. 9, 10 and 11. They are made in a section of the foundry set apart for the purpose. The drag part of the mold is a cast iron plate frame conforming approximately to the shape of the mold board and with a space for sand around the edge. It is ribbed at the back to present an approximately uniform thickness of metal. The cope is made in green sand and placed on the drag. The mold then is clamped and turned up on edge for pouring. The sprue extends from an opening in the top wall of the cope to a point near the bottom where a long runner delivers metal through a number of small, flat gates. Scored lines running at right angles all over the iron face of the drag are designed to hold the iron as it commences to congeal and prevent the formation of hollow places on the face of the casting. These light ridges afterward are ground off in the cleaning and finishing room. This feature entails practically no extra work, since the face of the casting has to be ground and polished. Bolt holes in the casting are formed by small dry sand cores resting in prints in the mill drag.

These castings are hard and brittle when they are poured and must be handled with care. While still hot they are buried in hot sand where they cool slowly for a period

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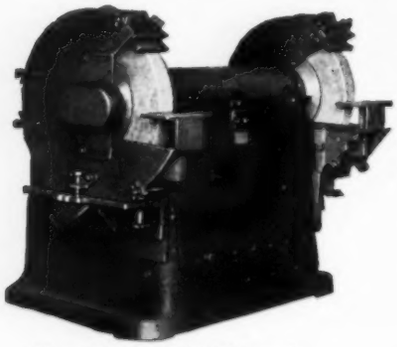

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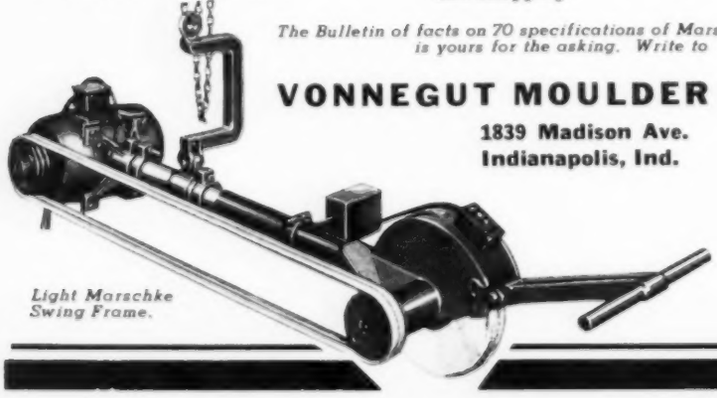

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of 24 to 36 hours. This constitutes a mild annealing process which converts the hard casting into one that is strong and tough. Iron for the plow points conforms to the following approximate analysis: Silicon 1.50 per cent, manganese 0.60 per cent, sulphur under 0.10 per cent, phosphorus under 0.50 per cent, total carbon 3.50 per cent. Mold boards are poured from a somewhat similar iron with the exception that the silicon content is under 1.00 per cent.

Cupolas in the plow casting shops and in the pipe fittings shop are provided with three breasts and spouts, one at each side and one in the usual place center front. Most of the metal is tapped through one of the side tapping holes from where it flows into a forehearth and is treated with soda ash before it flows into the ladles. Any necessary alloy additions to the metal also are made either in the forehearth or in the ladle. Usual temperature of the metal is 2850 degrees Fahr. Keeping up high standards of excellence in various classes of castings, and for some purposes producing an iron with a tensile strength of 55,000 pounds per square inch under present stringent conditions reflects an unusual degree of foundry technical skill and knowledge. General Manager Max Kunianski has described his methods before many chapters of the American Foundrymen's Association.

Use Special Shape Flasks

Molds and cores shown in Figs. 6, 7 and 8 are typical of a wide range of practically all shapes and sizes of cast iron pipe fittings. Molds are made on several jolt machines made by the Herman Pneumatic Machine Co., Pittsburgh, or under a sand-slinger furnished by the Beardsley & Piper Co., Chicago. Molds are made in cast iron flasks constructed to follow the contour of the pattern and to carry a minimum amount of sand. The joints are planed and lugs are fitted with pins and pin holes to insure an accurate fit between cope and drag. Sand strips in cope and drag help to hold the sand in place and bars in the drag eliminate the use of bottom plates. Openings in the ends or sides of the flask take the core prints and provide a means for anchoring the cores in place. The openings are large enough for the largest size casting within the capacity of the flask. Where a smaller size is made in the same flask and the end of the arbor does not rest on the iron, a small block of wood or a wedge supports the end of the core. Where the size of the opening is greatly in excess of the size of the core print, as shown in the branch core in Fig. 8, a short piece

of plate with a suitable semi-circular opening keeps the sand in place. Use of the block and wedge to support the weight of the core is shown in this illustration. A similar simple device is placed between the extension to the core arbor and the upper edge of the semi-circular opening in the cope. Since these flasks are too heavy to be hand lifted they are provided with trunnions on a center line to facilitate rolling with a minimum of effort.

For certain castings two halves of a split pattern are mounted on boards. For certain types of symmetrical castings one half pattern serves for cope and drag. The drag first is rammed and set on the floor. The cope then is rammed over the same half pattern, lifted from the machine, turned end for end and placed on the drag. Obviously the most extreme accuracy is required in setting the pattern or patterns on the board so that the resulting castings will not show a fin or shift along the joint line.

Pipe Cores Are Green Sand

Green sand cores are made in hinged coreboxes. A cast iron arbor made up of a substantial central member and a number of half disks spaced about 6 inches apart, is placed in the drag half of the corebox. Green sand is rammed in this box in the usual manner and scraped off flush with the edges. The second, or cope half of the corebox, without any arbor is rammed full of sand and scraped off in the same manner. The two halves are turned up on edge and brought together as in closing a book. The entire corebox then is turned back on the floor with the drag part underneath. The cope half of the corebox is rolled back out of the way and in readiness for the next core. The core is lifted out of the box and placed in the mold.

Set gates are attached to the patterns to leave clean, smooth openings for the passage of the iron into the mold as shown in Fig. 6. As a further precaution in the production of clean castings, a dry sand pouring basin is placed on the cope with the opening at the bottom near one end immediately above the sprue. The metal falls into a small depression at one end of the basin, then rises and flows to the other end where it falls through a strainer core into the sprue.

Department of Labor and Industry, Commonwealth of Pennsylvania, Harrisburg, recently has issued Safe Practice Bulletin No. 91 entitled "Safe Practice in the Manufacture of Aluminum." The text is a talk presented by G. J. Horak, chief engineer, Aluminum Cooking Utensils Co.

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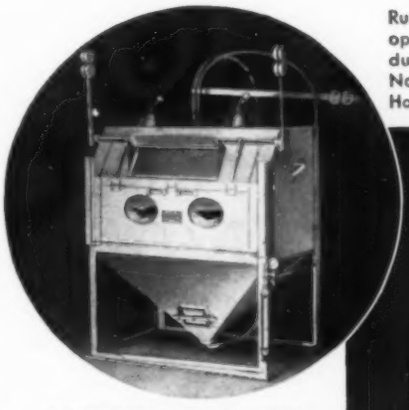

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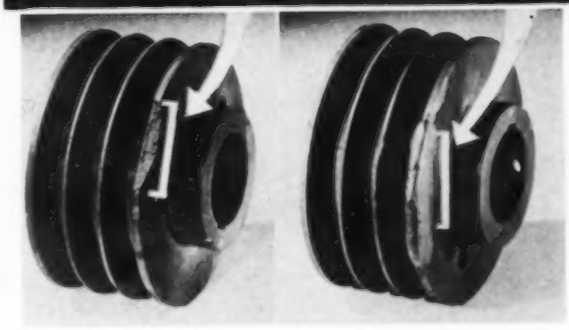

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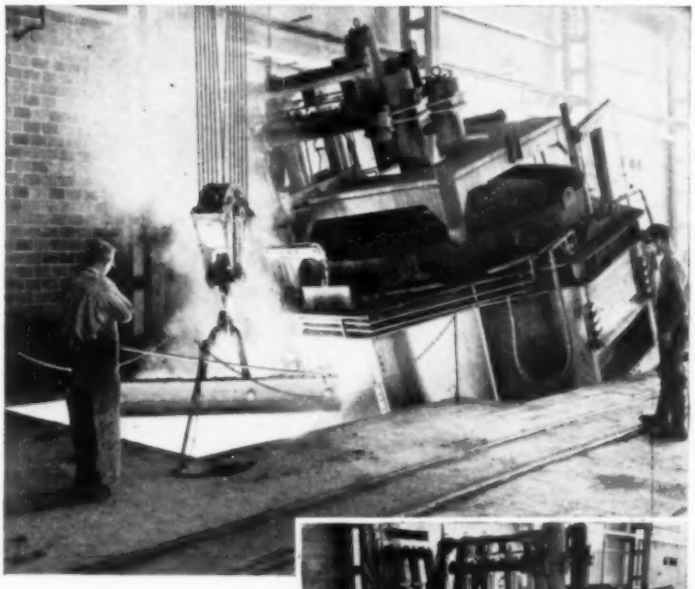

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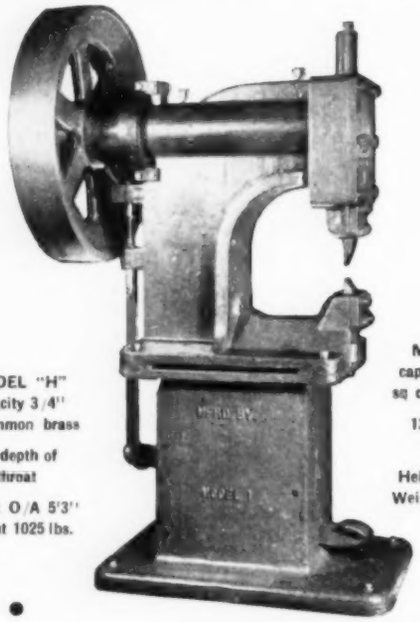

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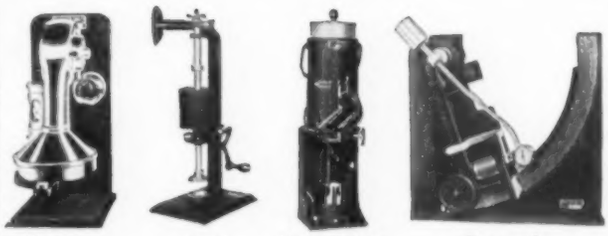

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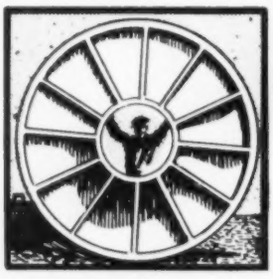

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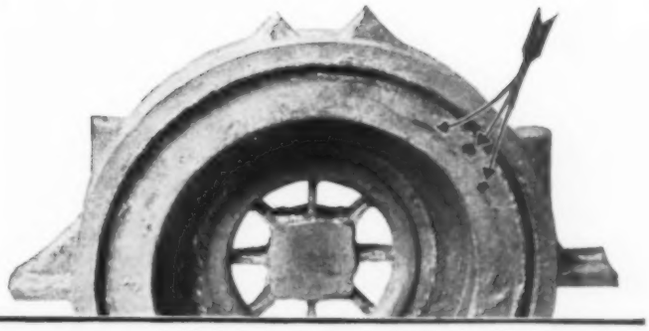

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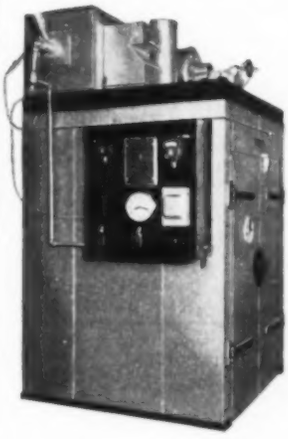

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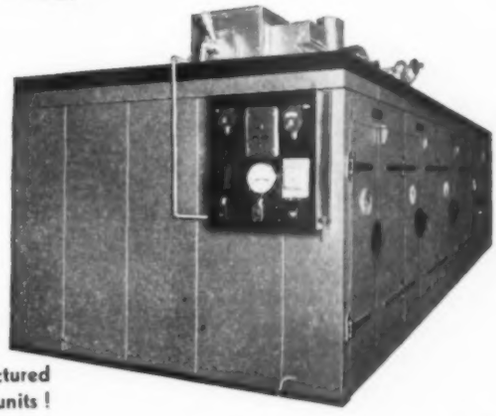

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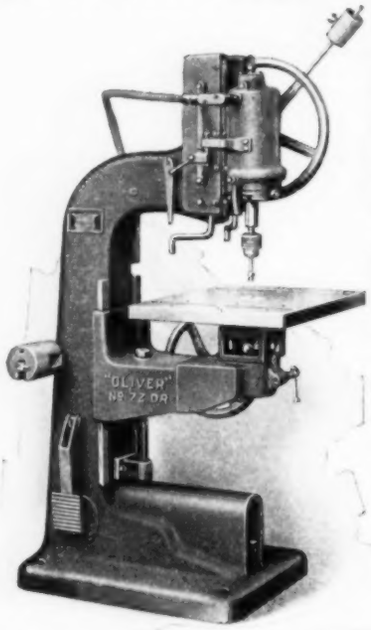

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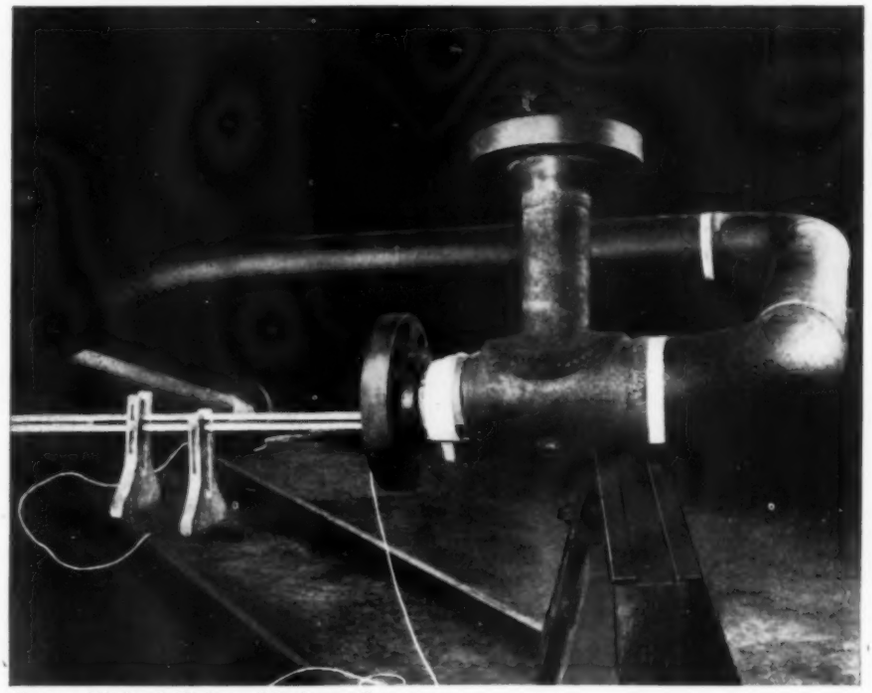

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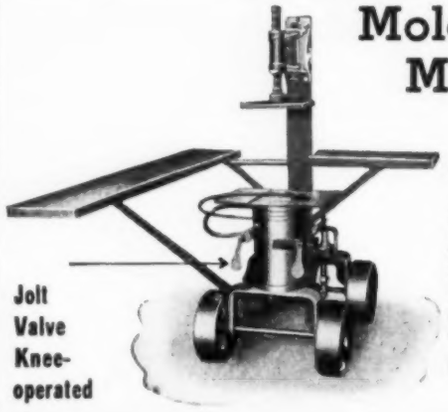

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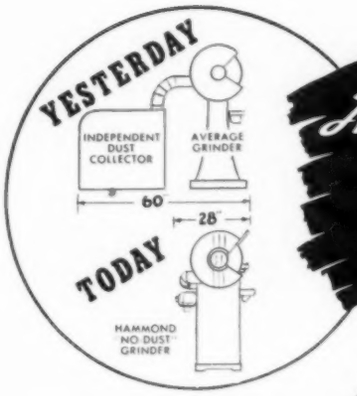

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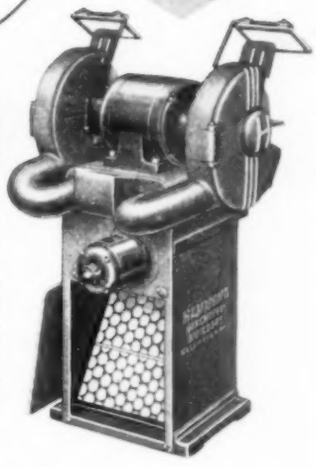

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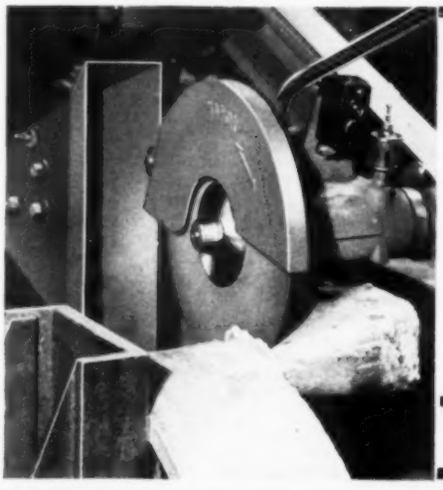

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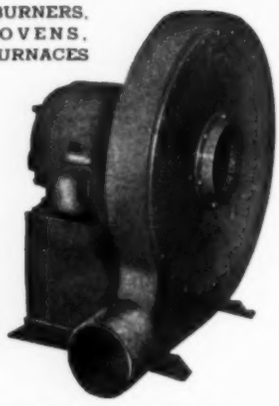

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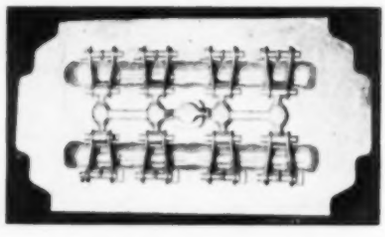

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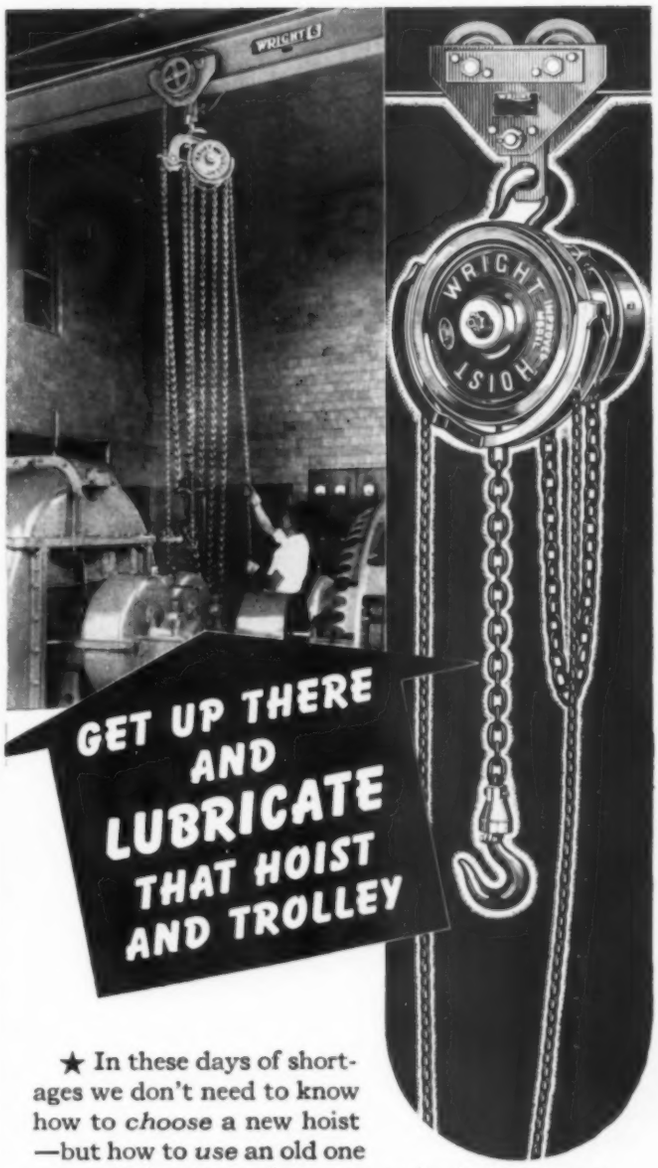

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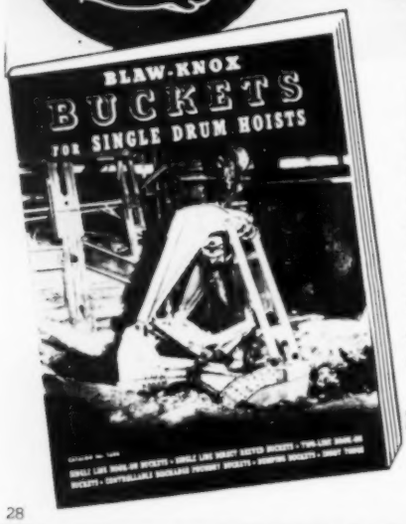

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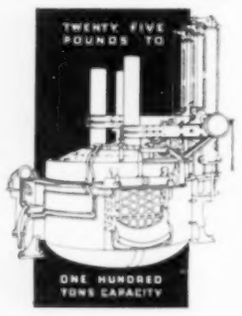

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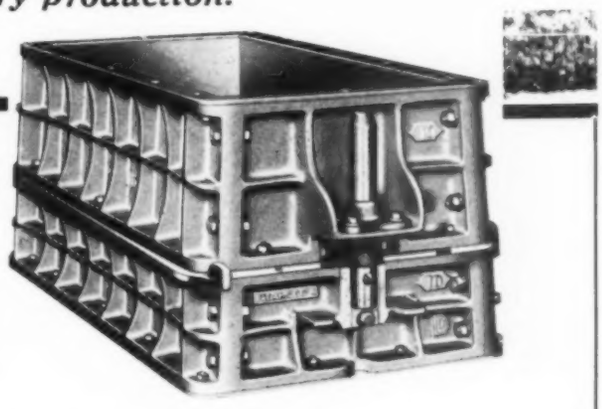

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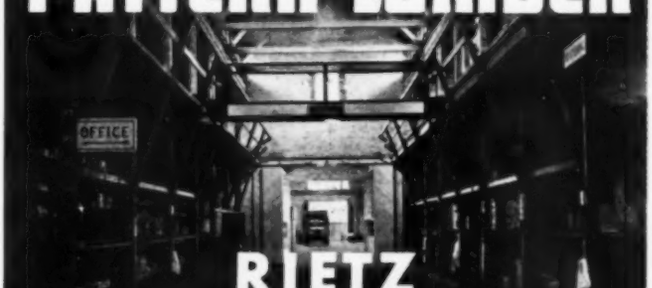

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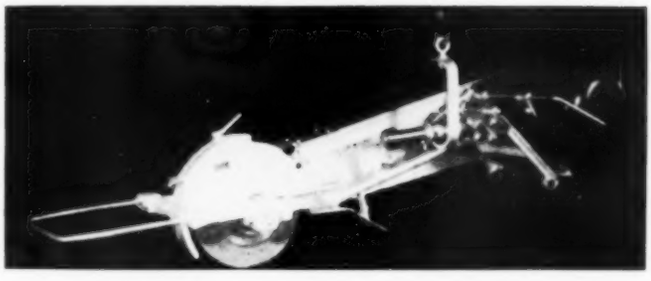

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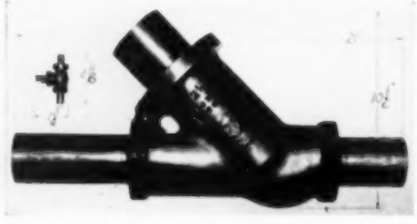

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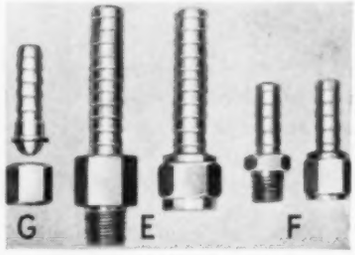

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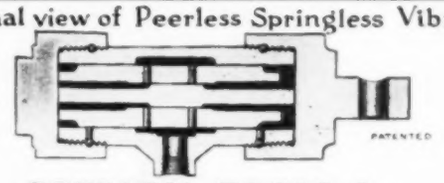

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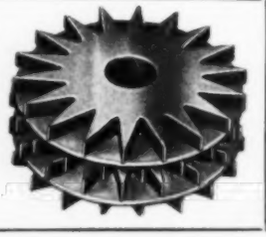

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FOUNDRY FOREMAN AND OR ASSISTANT FOREMAN

Wanted by gray iron foundry in southern Ohio operating almost 100 per cent on high priority work to supervise molding force for one unit of large plant for production and semi-production light and medium castings. Must be able to train "green" or inexperienced men. No responsibility for melting of iron. Must be American citizen, pass satisfactory physical examination. Give history of employment in last fifteen years covering in detail supervisory experience, duties, number of men responsible for and any other information covering your qualifications. Address Box 682, The FOUNDRY, Cleveland.

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Wanted two thoroughly competent malleable foundry foremen. We are looking for men with past records of high performance and who are willing to duplicate past good work in a large modern malleable iron plant. Write giving full details as to references and salary required. Address Box 646, The FOUNDRY, Cleveland.

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WANTED WHO IS EXPERIENCED IN DESIGN AND OPERATION OF MOLDS FOR EITHER ALUMINUM OR MAGNESIUM OR BOTH. ADDRESS BOX 681, The FOUNDRY, CLEVELAND.

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REPRESENTATIVES WANTED

Well-known manufacturer of high grade line of plumbago, facings, parting, blacking, core wash and allied foundry items wishes to obtain additional representation by salesmen now calling on foundries regularly. Liberal commission basis. Please advise territory covered, lines now handled, experience with foundry items, etc. Address Box 217, The FOUNDRY, Cleveland.

WANTED

A college graduate, having a degree and having specialized in Metallography, Spectroscopy, foundry practice, heat treatment of metals, use of hardness testing apparatus, making and breaking of test bars, and allied subjects, especially in the nonferrous field. Address Box 688, The FOUNDRY, Cleveland.

FOUNDRY FOREMAN WANTED!

One experienced on marine engine work. Must be aggressive and have sufficient experience to take charge of large gray iron foundry. In replying, give full details covering experience, age, copies of references from previous employers, and amount of salary expected. Address Box 698, The FOUNDRY, Cleveland.

WANTED

Leading supply house requires core oil sales manager to have full charge of sales force and advertising. This position has a real future for a high class man with experience and a following. Salary of secondary consideration to securing the right man. Reply (In strict confidence) stating age, nationality and complete experience to: Box 653, The FOUNDRY, Cleveland.

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STEEL FOUNDRY METALLURGIST WANTED

Midwestern open-hearth steel foundry has position to offer experienced metallurgist capable of supervising laboratory, heat treating, melting, and sand control. In replying state age, experience in detail and salary expected. Address Box 685, The FOUNDRY, Cleveland.

ASSISTANT SUPERINTENDENT WANTED

Must be practical foundryman experienced on heavy iron castings. Capable of reading blueprints, estimating molding time on inquiries. College education would assure attractive opportunity for applicant selected. Address Box 660, The FOUNDRY, Cleveland.

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EXCELLENT OPPORTUNITY WITH LARGE MANUFACTURING COMPANY FOR GRADUATE METALLURGIST WITH SEVERAL YEARS' EXPERIENCE. MUST POSSESS GOOD KNOWLEDGE OF MODERN FORGE SHOP AND COMMERCIAL HEAT TREAT OPERATION. ABOVE AVERAGE APPEARANCE AND TACT ESSENTIAL FOR FIELD CONTACT WORK. PLEASE STATE TRAINING AND EXPERIENCE IN DETAIL. AMERICAN CITIZEN ONLY. ADDRESS BOX 693, The FOUNDRY, CLEVELAND.

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Midwestern open-hearth steel foundry has position to offer experienced maintenance engineer familiar with foundry equipment, machine shop doing both production and maintenance work, electrical equipment and construction. In reply state age, experience in detail and salary expected. Address Box 686, The FOUNDRY, Cleveland.

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The item in question is of superior construction; priced competitively; repeats regularly; pays an attractive commission on both initial and repeat orders—and is **not** faced by any raw material problems.

Accounts on protected basis.

The Agents we seek must be firmly established; have evidence of a worthwhile clientele; and willing to exchange such confidences as will lead to local personal interview with one of our company executives.

To repeat—this is a rare opportunity for qualified Agents to substantially add to their permanent income through representing a firm they will be glad to be associated with.

In writing, please give all particulars about yourself; lines now handled, territory covered, etc. Address: Box 679, The FOUNDRY, Cleveland.

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Experienced in making gray iron machinery castings weighing up to ten tons each, to work as a gang leader and instructor in foundry fifty miles west of Pittsburgh, Pa. Address Box 706, The FOUNDRY, Cleveland.

ASSISTANT SUPERINTENDENT WANTED

For jobbing gray iron foundry in middle west. Prefer middle aged man who is thoroughly familiar with all phases of molding, who can mix metals and read blueprints. Address Box 708, The FOUNDRY, Cleveland.

REPRESENTATIVE WANTED

Large industrial concern supplying important foundry requirement wishes established firm representative in the South. Commission basis. Box 669, The FOUNDRY, Cleveland.

FOUNDRY FOREMAN WANTED

Experienced malleable iron; Midwestern location. Give full details, age and qualifications. Permanent position for right man. Address Box 703, The FOUNDRY, Cleveland.

WANTED

IN JOBBING FOUNDRY LOCATED IN EASTERN PENNSYLVANIA, PRODUCING STEEL CASTINGS, ACID ELECTRIC PROCESS, RANGING FROM 1 LB. TO 3 TONS, A MAN WHO IS THOROUGHLY FAMILIAR WITH HEADING AND GATING AND HAS A GOOD KNOWLEDGE OF MOLDING AND COREMAKING AND IS CAPABLE OF HANDLING MEN; ACTING IN THE CAPACITY OF ASSISTANT TO FOUNDRY SUPERINTENDENT. IN REPLY, PLEASE STATE AGE, EXPERIENCE AND SALARY DESIRED. ADDRESS Box 619, The FOUNDRY, CLEVELAND.

FOREMAN

Wanted by gray iron foundry to take charge of pouring, shakeout and sand conditioning on light and medium castings. Address Box 712, The FOUNDRY, Cleveland.

GRAY IRON FOREMAN

With foundry experience on floor and rollover work, semi-production castings, light and medium to 1000 lbs. Address Box 711, The FOUNDRY, Cleveland.

Positions Wanted

NONFERROUS FOUNDRY FOREMAN

Young man with over twenty years' experience desires position within twenty miles of New York City. Production, general jobbing and pressure castings. Address Box 667, The FOUNDRY, Cleveland.

Positions Wanted

GENERAL MANAGER AVAILABLE

Thoroughly experienced manufacturing and sales executive whose record shows consistent results in sales, production costs and net profits. Thoroughly experienced in foundry management as well as machinery and allied lines. Knows finance, labor and operating problems. Good personality. Excellent references. Address Box 670, The FOUNDRY, Cleveland.

PRACTICAL GRAY IRON FOUNDRYMAN

Desires position. Twenty-four years' experience in machinery castings, semi-steel, good cupola practice, getting up riggings, handling of men. Will consider a position of breaking in new men. Can give best of references. Address Box 705, The FOUNDRY, Cleveland.

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Practical gray iron foundryman, age 44, technically trained, graduate metallurgist; with 23 years' broad experience producing quality castings in machine tool, general jobbing and high production. Well-versed in green and dry sand, cupola, rigging for machines, coremaking, and working from blue prints. Desires to make connection with reliable foundry in New England or East. Address Box 694, The FOUNDRY, Cleveland.

GRAY IRON, STEEL AND NONFERROUS FOUNDRIES

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University training in metallurgy and business administration. Over twenty years' practical operating experience in modern molding methods, foundry engineering, costing and selling. Qualified record in improving castings and increasing profits. Address Box 699, The FOUNDRY, Cleveland.

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Practical and technical knowledge on brass and aluminum alloys. Can handle help and reduce costs. Reliable and available for any location. Address Box 702, The FOUNDRY, Cleveland.

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Experienced, draft exempt, and available on short notice. Accurate analyst and has produced clean, strong iron; also nonferrous metals. Address Box 695, The FOUNDRY, Cleveland.

FOUNDRY SUPERINTENDENT

Having twenty-four years as Foundry Superintendent, practical molder, technical education, desires position with foundry making high grade castings. Address Box 696, The FOUNDRY, Cleveland.

FOREMAN

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Modern electric steel foundry with pattern shop. Buildings and equipment in A-1 condition. Best of clientele. Address Box 709, The FOUNDRY, Cleveland.

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Completely equipped iron foundry. Overhead crane, Reading R.R. siding. Eastern Pennsylvania location. Good labor condition. Operating daily. Will sacrifice. Exceptional opportunity. Address Box 697, The FOUNDRY, Cleveland.

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FOR SALE

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One No. 0 Whiting cupola. Address Box 673, The FOUNDRY, Cleveland.

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4—Herman Jarr Stripper Tables 40" x 60".
6—Herman Jarr Rollover Pattern Draw, Table 30" x 36", 40" x 55", 40" x 60".
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1—Coleman Junior No. 2 Core Oven 5 drawers, 42" wide, height 6" & 7".
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1—2-stage Ing. Rand size 16 & 10½ x 12 cap. 770-CFM. @ 75 lbs. direct connected to a 125-HP. G.E. Syno. motor, 2300/3/60-cy., exciter, control, after cooler & tank.
1—No. 4 Wil. Green Positive Pressure cap. 13-cu. ft. per rev.
1—Spencer Turbo Blower 1300-CFM. @ 16-ox., 10-HP. motor, 220-volts, 3-phase, 60-cycle, 1760-RPM.

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1—Link Belt 24" x 55" hopper type Core Buster used with belt conveyor.
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FOR SALE

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Cast iron floor plates, uncracked, in good condition. Available for immediate shipment, our plant Chicago, suitable for use around foundry.

HYMAN-MICHAELS COMPANY
122 S. Michigan Ave. Chicago, Illinois

AIR COMPRESSORS

BELTED—176 ft., 355 ft., 540 ft., 676 ft., 752 ft. & 1300 ft.
ELECTRIC—355 ft., 528 ft., 676 ft., 807 ft., 1302 ft., 1723 ft., 2022 ft., 2200 ft., 2800 ft., 3600 ft., & 5000 ft.
STEAM—368 ft., 500 ft., 800 ft., 1221 ft., 1640 ft., 2200 ft., & 3000 ft.
DIESEL—368 ft., 603 ft., 900 ft. & 1300 ft.
GASOLINE—110, 160, 220, 310, 1300 ft.

R. C. STANHOPE, INC.
60 East 42nd St. New York, N. Y.

FOR SALE

1—26" x 48" Sly steel tumbling mill
1—Type "K"-84" American sand cutter, Buda motor
1—20" Davenport jolt stripper
1—24" International type "R" rollover
2—No. 112 Milwaukee jolt squeeze strip
3—No. 11-32 Nichols jolt squeeze strip
5—Arcade "Modern" squeezers
2—No. 104 Milwaukee jolt squeezers
25—Hand strippers, round or square

CHAMPION FOUNDRY & MACHINE CO.
1314 West 21st St. Chicago, Ill.

REBUILT COMPRESSORS AND BLOWERS

2800 CFM, @ 1 lb. North American Turbo Compressor with 20 H.P., 3600 RPM A.C. motor.
1250 CFM, @ 3¼ lbs., 3600 RPM Gen. Elec. with 30 H.P. A.C. motor drive.
(3) Buffalo Forge Pressure Blowers, 1200 cfm @ 11 oz., 9½" inlet, 7 x 7 outlet, driven by 7½ H.P. A.C. Motors.
450 CFM, 3500 RPM Gen. Elec. with 6.2 H.P. A.C. motor drive.

SAND VIBRATOR

Jeffery-Traylor, shaker type CVS-8, 6" wide hand deck, capacity 7 to 8 tons sand per hour; with 15 cycle, 110 volt, single phase vibrator motor generator set. Write, wire or phone.

The Motor Repair & Mfg. Co.
1552 Hamilton Ave. Cleveland, Ohio

FOR SALE

1 No. 350 Detroit Electric Furnace 100 K. W.—2300 Volt—60 Cycle. Complete with trays, etc., also supply of electrodes. Address Box 713, The FOUNDRY, Cleveland.

For Sale

REBUILT USED EQUIPMENT

Molding machines, all types; tumbling mills; furnaces; cupolas; air compressors; hoists; rammers, all types; ladles, all types; sand mixers; sand blast tanks; core machines, etc. All equipment rebuilt and guaranteed. All sizes used steel flasks.

HAYNES FOUNDRY EQUIPMENT COMPANY
1734 Lake St. Kalamazoo, Mich.

FOR SALE

One Pennsylvania compressor, with 50 h.p. motor and starter. Operates 275 r.p.m.; stroke 10"; air pressure 100 pounds; compressor pulley is 60" x 10½" face; motor is 17¼" x 11" face; motor speed 870 r.p.m. at full load. Can be seen in operation at present.

The Connecticut Malleable Castings Company, P. O. Box 1454, New Haven, Connecticut.

FOR SALE

1—Practically new Wilbraham cupola blower, geared to 50 h.p.—G. E. motor, mounted on cast iron base $480.00
1—Phillips-McLarens wet pan muller, belt drive $280.00
1—No. 101 Osborn jolter $65.00

For complete list of equipment and description write:

E. A. MEYER
Green Bay, Wisconsin

SPECIAL DEFENSE BARGAINS

Wet Tumbling Barrel—N. Ransohoff Co., "Ideal" end loading—end unloading return tumbling barrel motor drive. Barrel 36" x 36"—3 cu. ft. cap., continuous or batch operation. Ideally suited for small brass castings.

Air Compressor Unit—8½ x 12 Worthington Vee Belt drive with receiver, starter unloader etc. complete unit. 40 HP 3-60-220 motor.

Fans—Blowers—Exhausters for cooling, ventilation and dust or fumes removal. Multivane Fans in all st'd. makes and styles for large air volumes at low pressures.

Fan or **Centrifugal** style blowers—Maxon-Premix—from No. 1 to No. 6, Spencer Turbine, Gen. Electric, Am. Blower Co., Sturtevant, Buffalo, Clarge, Ilg etc. for Gas or Oil fuel Combustion.

Rotary Pressure Blowers — Roots-Connersville, Garden City, Green, Piqua, Sturtevant, Am. Gas Furnace Co. etc.

Furnaces for Brass and Aluminum Melting—Hausfeld Tilting open flame 400 lb. brass cap.; Booth Electric 725 lb. brass cap. with instruments and transformer. Stationary Furnaces, swing top for crucibles No. 6 to No. 150 and open top for iron pots up to 300 lb. aluminum.

Schwartz Furnaces—1—60" & 1—42".

Molding Machines—Osborn No. 401 stationary, jolt-squeeze-rollover-draw 20" x 30". Osborn No. 404-S, No. 405-S and No. 85 Pit Type jolt-squeeze-strippers. "Berkshire" 34" wide stationary air squeeze. "Tabor" 8" cyl. air squeeze. "Battenfeld" (Johnston & Jennings) stationary jolt squeeze; 5 in. stock. Arcade—portable 2 in stock 8 & 10" cyl. Adams—Stationary hand squeezers 48" wide 2 in stock. Mumford—Stationary Air Squeeze 14 x 18" platen. Tabor—Hand operated, portable, Rollover, draw for 20 x 30" flasks or core boxes, 3 in stock. Nichols—10" x 32" Stationary 20 available. Tabor 28" x 41" portable shockless jarring rollover draw.

Sand Blasts—pressure generator tanks with hose & nozzles. Sly wet Cinder mill.

Sand Blast Barrel—New Haven 36 x 46" for Motor direct connected.

Sand Blast Table—Pangborn 8' dia. self contained fine for brass and iron castings.

Blystone Sand Mixer. 5 cu. ft. cap.

Combs Sand Riddle—1—type CS

Tell us your needs.

CLIFTON MACHINERY CO.
1023 W. 6th CINCINNATI, O.

Classified Advertising

For Sale

ELECTRIC FURNACE

1000 lb. Swindell-Dressler with hydraulic tilting cylinder, pump, motor and three 200 KVA transformers, 22,000 V. primary, 90 V. secondary. Used on experimental work. Immediate shipment.

GALBREATH MACHINERY COMPANY

306 Empire Bldg. Pittsburgh, Pa.

FOR SALE

400 snap flasks, Cherry and Mahogany, sizes 9" x 15" to 14" x 15", excellent condition, entire lot reasonable. **Box 168, Decatur, Illinois.**

FOR SALE

1000 lb. Detroit rocking type electric furnace complete with 300 KVA 4600 volt transformer and panel board.

Address Box 671, The FOUNDRY, Cleveland.

FOR SALE

One Dings magnetic separator, speed 40-50 110 volt. No. 8921. Type X No. 1. Address Box 707, The FOUNDRY, Cleveland.

For Sale

FOR SALE
In Perfect Condition

2 Shepard Drop-Bottom Cupola Charging Buckets Inside diameter 31", outside diameter 33". Inside height 42", over-all height from bottom of wheels to top edge of buckets 18".
PITTSBURGH CRUSHED STEEL COMPANY

P. O. Box 4038 Pittsburgh, Pa.

REBUILT
BLOWERS—FANS—EXHAUSTERS

Roots-Connersville positive cupola blowers. Centrifugal blowers for gas and oil burning. Sand blast, grinder and dust exhausters. Ventilating fans.

GENERAL BLOWER COMPANY

406 N. Peoria St. Chicago, Illinois

FOR SALE

1—3 ton Harnischfeger Corporation crane, 32' ft. span, cage operated, 220 Direct Current. Address Box 672, The FOUNDRY, Cleveland.

FOR SALE
USED FOUNDRY SNAGGING GRINDERS

1—United States 5 h.p., 1200 r.p.m., A.C.
1—United States 7½ h.p., 1200 r.p.m., A.C.
Excellent Condition

MACHINERY & ELECTRIC MOTORS COMPANY
Tool Room and Production Machinery

819 West Lake Street Chicago

For Sale

FOR SALE

One No. 7 Whiting cupola in good condition with enough brick to line same.
One P. & H. Roots-Connersville No. 5½ belt drive blower, No. 32890.
One set 4 beam charging scales.
Price $2000 for lot F. O. B. truck, Springfield, Ohio.

J. O. GRIFFIN

2030 W. Main Street Springfield, Ohio

SAND BLASTING EQUIPMENT

2—No. 100 type I fans, Clarage Fan Co.
1—No. 9 Sirocco fan, American Blower Corp.
2—Dust collector units, capacity each 13,000 lbs. 4 Hopper bottoms, size 8' x 32' x 11' high.
1—75 ton storage bin.
Bargain For Immediate Sale

RUPP EQUIPMENT COMPANY
101 Great Arrow Avenue
Buffalo, New York

FOR SALE

2—No. 14-D-36 Nicholls jolt strip squeeze molding machines. Address Box 701, The FOUNDRY, Cleveland.

FOR SALE

One No. 7 Whiting cupola, serial No. 2937, 6' 0" O.D. 5/16" shell, 52" dia. furnace, complete with 4 C. I. legs, approximately 30' 0" high overall complete with a Connersville blower. One cupola (no name or serial number) 3' 10" O. D. ¼" shell, 32" dia. furnace, complete with legs, approx. 30' 0" high overall, complete with Sturtevant blower having a 28" fan wheel. **Address Box 692, The FOUNDRY, Cleveland.**

FOR SALE

1—Pangborn No. 2 type GF blast cleaning barrel, like new. Priced reasonably. Call or write, **Kelly Foundry & Machine Co., P. O. Box 232, Elkins, W. Va.**

For Sale

Chain Hoists
Air Rammers
Air Drills
Air Grinders
Chipping Hammers
Air Vibrators, all makes & sizes
1—Air Hoists, Horizontal type
3—Air Hoists, Cylinder type
1—1000 lb. Worm Gear Ladle
1—1500 lb. Worm Gear Ladle
1—2 Ton Worm Gear Ladle
1—3 Ton Worm Gear Ladle
1—4 Ton Worm Gear Ladle
1—800 lb. Worm Gear Ladle
2—1000 lb. Bull Ladle with bail
1—Modern Cylindrical ladle, with bail & stand, 2500 lb. capacity
25—200 lb. Shank double end
6—No. 1 Red Electric Vibrators
6—No. 5 Red Electric Vibrators
6—Red Electric knee switches
1—Band Saw
1—Drill Press
1—SP Clarage Fan No. 70 exhaust
1—7 cu. ft. Blystone Sand Mixer with 5 H motor, direct drive
2—3 cu. ft. Blystone Mixer with motor
1—Clark Blast Gauge
1—Sand Bucket—self dumping
1—Disc Grinder double wheel 24" dia.
3—Grinding Wheel Stands with motors
2—Grinders motor driven
3—Fairbanks Morse scales, 1000 lbs. cap.
1—Toledo Scale 500 lbs. cap.
1—42" Cupola
1—Core Oven, 5 tray, coke or gas fired, 36" wide, 51" high, 31" deep, shelves pull out.
1—Core Car, 4 wheels, 134" long, 57" wide, 54" high, 48" gage
1—10 x 10 Ingersoll-Rand Air Compressor
1—8 x 8 Ingersoll-Rand Air Compressor, Class N. E. I. with 50 H motor, 220 v.
1—6 x 6 Gardner Air Compressor, belt driven with Lincoln motor 2 H. 220 v
2—6 x 6 Ingersoll-Rand Air Compressors
12—Brillion Iron Pouring Devices
1—6 x 6 Curtis Air Hoist
3 and 4 Ton Electric Hoists, floor operated, one Northern and one Sprague
1—Sand Blast Barrel Model A
4—Core Racks
1—Beardsley & Piper Stationary Sand Slinger, never used
2—Water Tumblers
1—Dust Arrestor
400-ft. Richard Wilcox Monorail curves and switches, trolleys
2—Power Sprue Cutters
2—Fisher Furnaces, complete
1—Monarch tilting furnace complete
2—24 x 48 Campbell-Hausfeld open flame furnaces complete
1—20 x 20 Tilting Sand Blast No. 9
1—Sand Blast Cabinet
1—24" x 84" Tumbling Mill
2—32" x 32" x 48" Tumbling Mill
2—36" x 36" x 60" Tumbling Mill
2—24" x 48" in one unit
2—30" x 50" in one unit
1—6' Simpson Mixer, with speed reducer, 10 H motor, loading bucket and switches
2—Champion Core Machines
2—Sand Blast Generators

INTERNATIONAL MOLDING MACHINES
1—type "JW" 14" x 22" x 8" draw
2—type "JW" 12" x 22" x 4" draw
1—type "TJ" 24" x 10" jolt stripper
1—type "R" 20" x 8"
1—type "JW" 20" x 22" x 8" draw, jolt stripper
6—type "JS" 2 jolt squeezers
2—type "R" 14" x 8"
1—type "G" 24" x 10"

MILWAUKEE MACHINES
1—Jolt stripper squeezer
1—Plain squeezer

HERMAN jolt rollover machines
1—**ARCADE,** air jolt, hand roll, foot draw, 22 x 22 table, 8" draw

OSBORN MACHINES
16—"J75" squeezers
1—No. 403 machine
1—"J74" plain squeezer

TABOR MACHINES
1—Jolt squeezer
2—Jolt strippers
We cast iron and aluminum jackets, all sizes.
Rebuilt motors, all sizes which are guaranteed.
Blowers and exhaust fans.

PRESSED STEEL FLASKS
22—12 x 24, 7 cope, 6 drag
120—15 x 26, 4 cope, 4 drag
20—13 x 15, 4 cope, 5 drag
12—10 x 26, 8 cope, 3 drag
12—12 x 20, 6 cope, 6 drag
5—18 x 26, 6 cope, 6 drag
25—18 x 20, 6 cope, 6 drag
100—11 x 41, 8 cope, 4 drag
100—12 x 40, 6 cope, 6 drag
200—19 x 33, 7 cope, 3 drag
100—14 x 36, 6 cope, 6 drag
150—19 x 19, 4 cope, 4½ drag
150—18 x 28, 4½ cope, 4½ drag
16—17 x 19, 6 cope, 3 drag
52—17 x 19, 11 cope, 10 drag
73—14 x 27, 7 cope, 7 drag
25—14 x 27, 7 cope, 5 drag
40—18 x 26, 12 cope, 5 drag
50—18 x 25, 10 cope, 3 drag
30—20 x 26, 12 cope, 3½ drag
10—11 x 19, 5 cope, 4 drag, ½ pin
56—20" round, 4 cope, 4 drag, ½ pin
50—14 x 34, 8 cope, 8 drag, (cast iron)

CORE PLATES, PRESSED STEEL
125—11 x 30
12—28 x 30
103—12 x 24
102—14 x 18
74—12 x 37
15—15 x 20
19—28 x 28
102—14 x 21
68—16 x 25
90—15 x 37
40—17 x 47
50—21 x 21
85—14 x 28
70—15 x 16

CORE PLATES, CAST IRON
50—13 x 34
200—11 x 24
610—11 x 11
20—12 x 18
400—6 x 21
500—6 x 6

CORE PLATES, ALUMINUM
79—16 x 35

CORE PLATES, COMPOSITION
100—7½ x 32

HAYNES FOUNDRY EQUIPMENT COMPANY

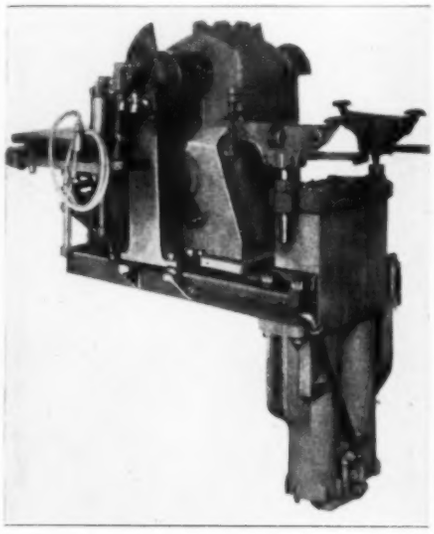
1734 Lake Street **Kalamazoo, Michigan**

"SCULLY-JONES" RECONDITIONED FOUNDRY EQUIPMENT

♦ Ready for immediate shipment, this equipment has been completely rebuilt in our modern machine shop. Prices on request.

INTERNATIONAL MOLDING MACHINES

1 49 x 16" draw Type "F," fitted with air equalizers, rollers in the draw section and hand operated core box clamps, jar plate 100" long, 6000 lbs. cap.



INTERNATIONAL TYPE "F"
(Enclosed Model)

48 x 16" draw Type "F"—4200 lbs. cap. @ 80 lbs., table size 48 x 83".

37 x 16" (adjustable draw, can be set to max. of 25") Type "F" table size 34 x 70", 3800 lbs. cap. @ 80 lbs. press.

31 x 16" draw, Type "F" table size 31 x 60", 2500 lbs. cap. @ 80 lbs. pres., with roll-off table and air equalizers.

42 x 16" draw Type "F" (with double cylinders) 3400 lbs. cap. @ 80 lbs. pressure.

27 x 12" Type "F" International (enclosed cyl. type) 1400 lb. roll-over capacity @ 80 lbs. pressure.

Herman INDEPENDENT TURN-OVER and PATTERN DRAWING DEVICE MACHINES

42 x 72" jar roll-over, 40 x 72" jolt table.
46 x 56" jar roll-over, 40 x 50" jolt table.
40 x 60"—15" dia. cyl. 9500 lbs. cap. @ 80 lbs. press., 42 x 60" jolt table.

CORE MACHINES

Champion Type "CA" stationary Plain Core Jarring Machines, 13½" table, 4" dia. cyl.

No. 832 Milwaukee hand jolt and roll-over, foot draw, portable, 15 x 32" table, max. flask size 24 x 32"—30" height pattern table

JOLT SQUEEZE & POWER STRIP

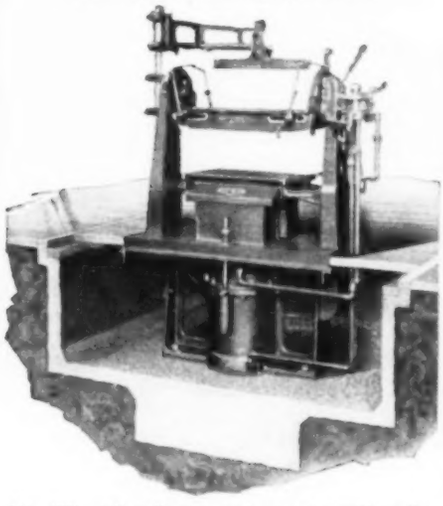
No. 142 Milwaukee, stationary, stripping cap. 1200 lbs. @ 80 lbs. press., draw 6" table 19 x 35"—open end type.

No. 152 Milwaukee, portable, max. pattern draw 6", pattern length 28" width 20", 1200 lbs. cap. @ 80 lbs. press., 22 x 30½" table.

No. 703-6 Osborn jolt squeeze and strip, 21 x 28" table, stationary, length of opening in lifting frame 34", 6" pattern draw, 8" cyl. dia. 1000 lbs. jolt. cap. @ 80 lbs. pressure, distance from lifting frame to squeeze head 24¼", flask length 44½", with roll off conveyor.

No. 703-5 Osborn, same as above excepting 17 x 35" table.

OSBORN Molding Machines



No. 332, jolt roll-over and squeeze with roller conveyor attachment, flask cap., max. length 36" width 26" pattern draw 9"—750 lbs. cap. @ 80 lbs.

No. 333, flask cap. max. length 45" width 32" —pattern draw 11", 1400 lbs. cap. @ 80 lbs. press. squeeze cyl. dia. 19".

No. 403-W Osborn jolt roll-over and pattern draw, flask cap. 52 x 36", 12" draw, with swing-out Mold Table, Power Roll-Over.

No. 513-E Osborn Air Jolt and Electric Roll-Over, pattern draw and Run-Out Car, flask length O/A 124" width 72" capacity, width of roll-over table 60"—pattern draw 30"—cap. @ 80 lbs. pressure 12,000 lbs. with 15 HP Motor.

SAND MIXERS-CONDITIONERS-THROWERS

No. 3, 8 ft. dia., 11 x 32" heavy duty type double Mullers, arranged for motor drive, but without motor, with gear reduction and outboard bearing.

Model "B" Royer Sand Separator and Blender, cap. 300 lbs. sand per min., portable, with AC Motor.

Model "D" Royer Sand Separator and Blender, 800 lbs. sand cap. per min., portable with 3/60/220V AC Motor.

ELECTRIC GRINDERS

Black & Decker "Constant Cutting Speed" FLOOR STAND, max. wheel size 24 x 4", ball-bearing spindle, with 10 HP 230V 1035 RPM DC Motor, totally enclosed. Push Button Control with Magnetic Type Starter.

Murray A-92 VERTICAL DISC GRINDER, take 26" dia. disc, ball-bearing, 10 HP 3/60/440V AC Motor, with counterweight for extra shaft.

LOT 34 x 34 x 48" x 1" plate Sly SQUARE MILLS, in line, or will sell individually, driven from tight clutch pulley.

SQUEEZERS

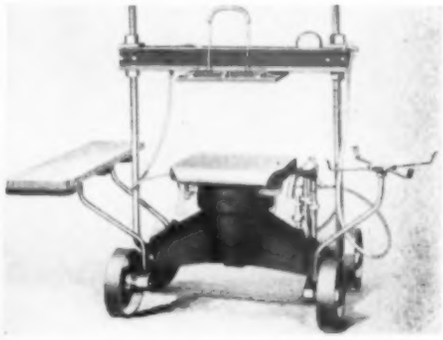
LOT Moline No. 3, portable Hand Squeezers.

LOT Tabor, stationary 36" between rods, 18 x 26" table, 13" dia. cyl. Plain Air Squeezer.

No. 74 Osborn portable, 33" between rods, 17 x 18" table Plain Air Squeezer.

JOLT SQUEEZERS

No. 103 Milwaukee, stationary, 17 x 21" table—10" dia. cyl.



No. 75-J Osborn portable, 36" between rods, 16 x 20" table.

LOT No. 75 "WJ" straddle type, portable, 36" between rods, 17 x 21" table.

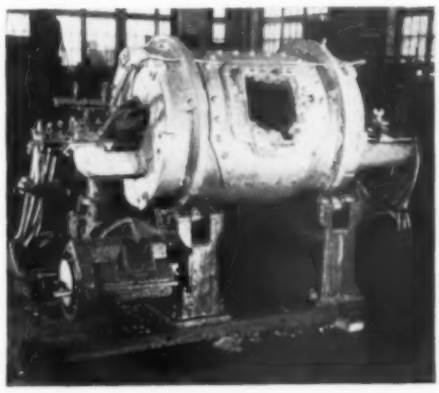
HERMAN BUMPERS

60 x 72" table, 15,000 lbs. cap. @ 80 lbs. press., 19½" dia. cyl.

50 x 50" table, 6100 lbs. cap. @ 80 lbs. pressure.

40 x 50" table, 6400 lbs. cap. @ 80 lbs. press., 13" dia. cyl.

DETROIT ELECTRIC FURNACE



Detroit 350 lb. Rocking Type ELECTRIC FURNACE complete with Transformer 200 KVA, 2300 volt, 90 volt secondary, oil circuit breaker and instrument panel.

Above items represent but a portion of our used or reconditioned FOUNDRY and INDUSTRIAL EQUIPMENT BARGAINS . . . Send for our current STOCK LIST No. 69 which shows COMPLETE STOCK on hand at our CHICAGO WAREHOUSE and advise as to your exact requirements.

SCULLY-JONES & COMPANY (Foundry Division) 19th & ROCKWELL STS.
PHONE LAWNDALE 8770 — CHICAGO, ILLINOIS

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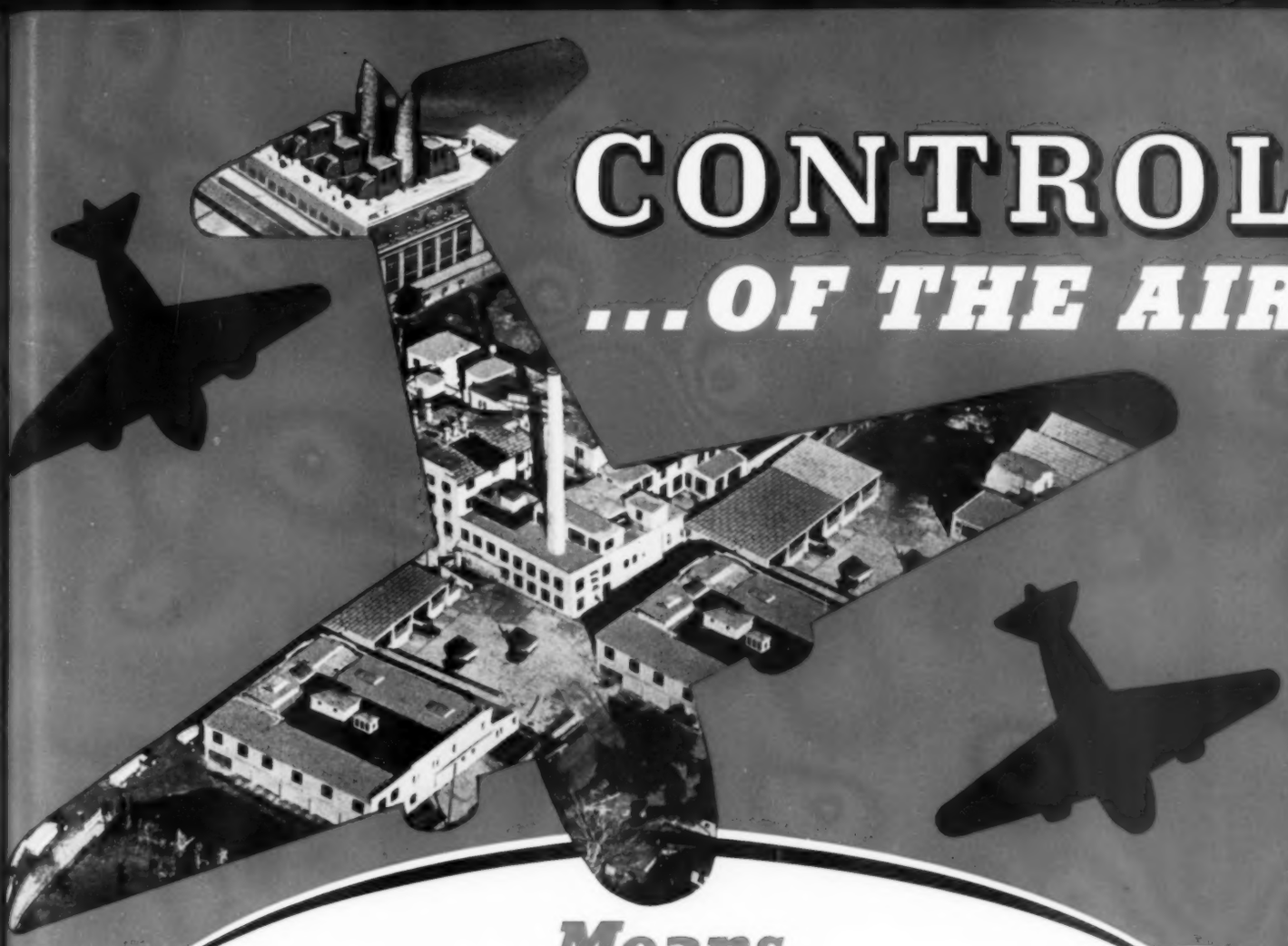
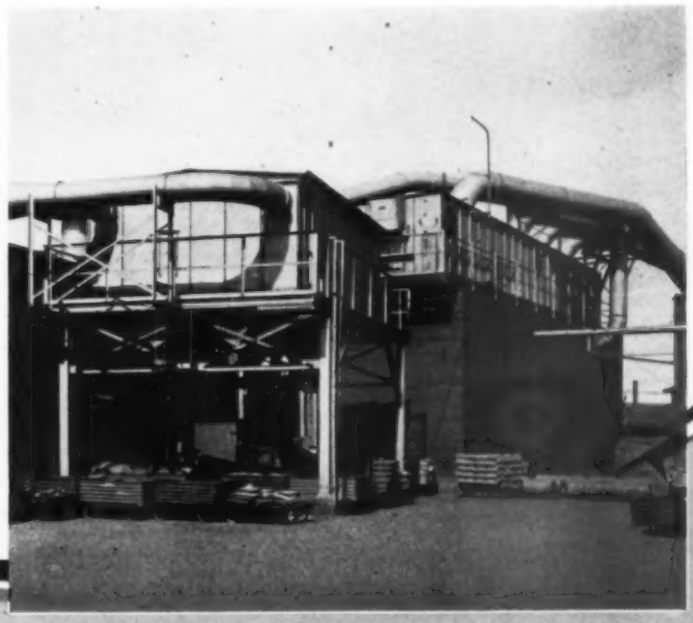


CONTROL
...OF THE AIR

Means
INCREASED Production and Profits
PROTECTS Employees, Equipment and Plant

Installation of Parsons Oval Bag Dust Arrestors means an immediate "pole vault" in production, less breakdowns and more productive working hours per employee. Add to these outstanding advantages, protection for employees, plant and equipment plus tremendous profits obtained from "fines" collected and there you have some of the reasons why you cannot afford to be without Parsons Oval Bag Dust Arrestors. They pay for themselves and keep on paying dividends for years. • Parsons Oval Dust Bag Arrestors instantly convert a dusty, dirty, dismal plant into a clean, pleasant, modern plant geared for today's modern production requirements and tomorrow's keen competition.



Write for free catalog "Mastery of The Air," it tells the whole story.

PARSONS *Engineering* CORP.

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WIN VICTORY WITH *Modern* EQUIPMENT

THE MODERN VICTORY LINE

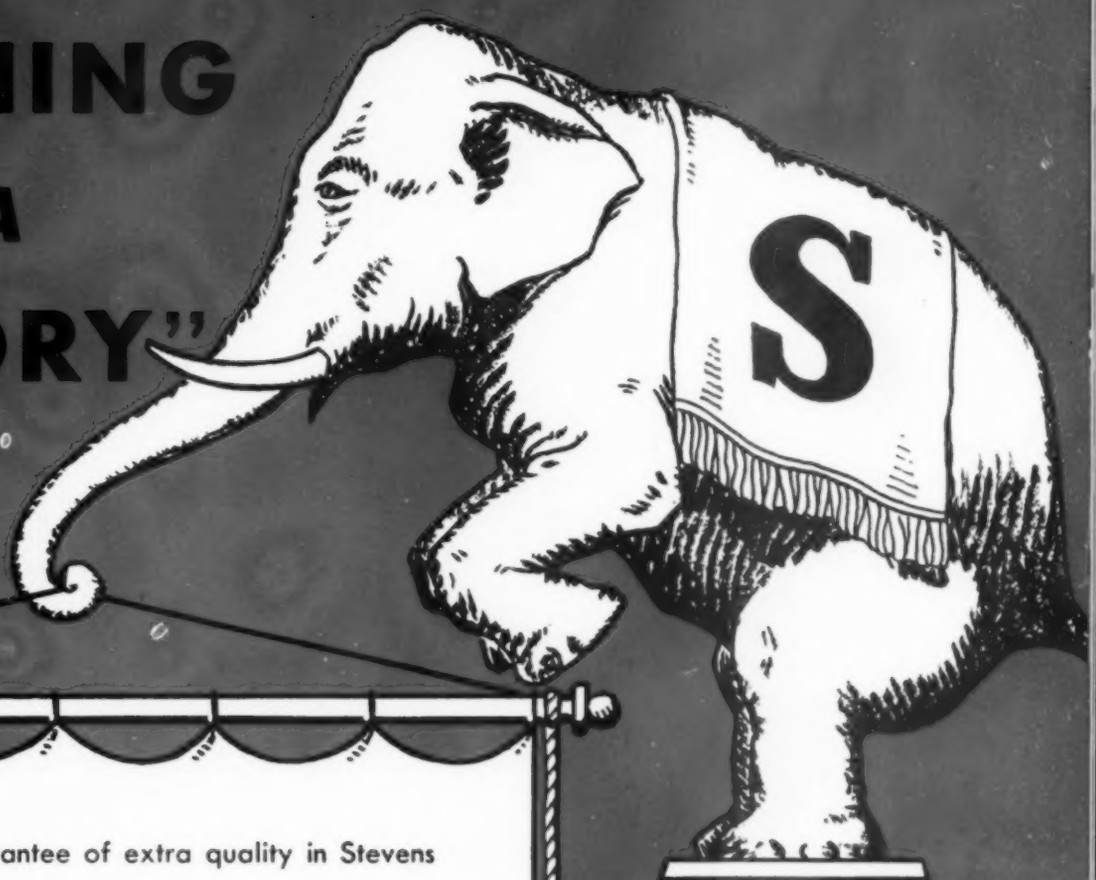
Cupolas — Cupola Chargers — Covered & Insulated Ladles — Lifetime Geared Ladles — Improved Bottom Pour Ladles — Metal Pouring Systems — Crane & Monorail Systems For Metal & Mold Handling — Furnace Charging Cranes — Electric Mold Skin Driers.

MODERN EQUIPMENT COMPANY

PORT WASHINGTON, WISCONSIN

MODERN EQUIPMENT CO.
PORT WASHINGTON, WIS
DEPT. 190

EVERYTHING FOR A FOUNDRY"



There is a two-fold guarantee of extra quality in Stevens facing materials.

Laboratory control of raw materials and grinding and blending operations—is combined with broad experience and diversified application under actual operating conditions.

Our staff includes men who are qualified by training and experience to study your problem and recommend a specific product for the job.

Today it's imperative that you get good castings, quickly. Let "Double Control" go to work for you. Specify Stevens.

STEVENS EAST INDIA PLUMBAGO

Each grade of Stevens Plumbago is designed to give the utmost in casting quality; to minimize scrap losses and to reduce casting defects.

STEVENS CORE WASH

There is a Stevens grade of Core Wash or Blacking that is just right for the job you are doing. • Write for a sample.

STEVENS PARTING COMPOUNDS

Choose one of these popular grades: • Sno-White non-silica Parting • Columbia, the King of Tripoli Parting • Mol-Dust lime-free Parting and for pattern plates only —Stevens Liquid Parting.

FREDERIC B. STEVENS, INC.

Detroit, Michigan

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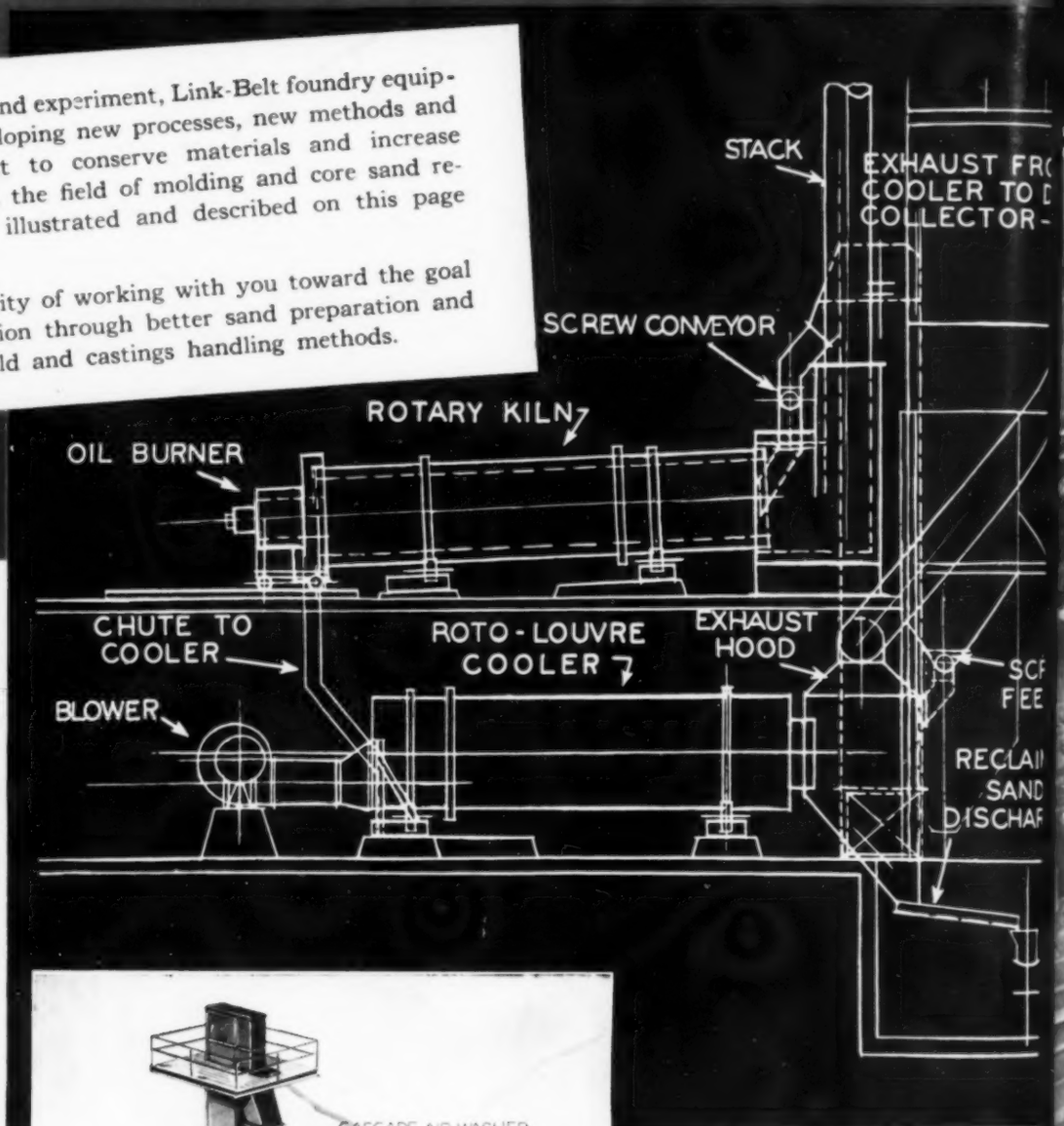
• 2368 Dundas St. West . . . . . Toronto, Ontario

NEW Developments

In Molding and Core Sand Reclamatio

Through continuous research and experiment, Link-Belt foundry equipment engineers are ever developing new processes, new methods and better mechanical equipment to conserve materials and increase efficiency and production. In the field of molding and core sand reclamation, the two systems illustrated and described on this page are typical.

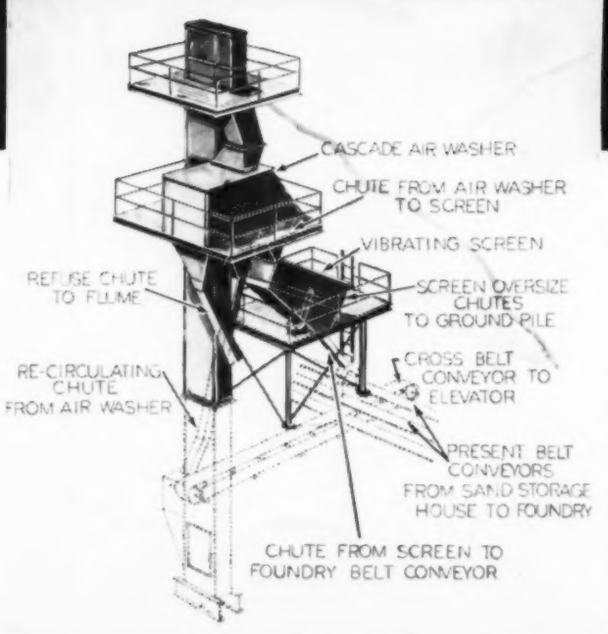
We welcome the opportunity of working with you toward the goal of speeding defense production through better sand preparation and reclamation, core, sand, mold and castings handling methods.



High Temperature Process with Rotary Kiln and Cooler

(Patents Pending)

This is a new and revolutionary process of renovating and reclaiming used foundry sand. In actual performance it has produced a product as clean and at times cleaner, than the original sand. The method consists essentially of granulating the sand lumps and heating to temperatures which remove carbonaceous and other foreign material and then cooling for reuse. Let us tell you more about the advantages of this new method.


CASCADE AIR WASHER
CHUTE FROM AIR WASHER TO SCREEN
VIBRATING SCREEN
REFUSE CHUTE TO FLUME
SCREEN OVERSIZE CHUTES TO GROUND PILE
CROSS BELT CONVEYOR TO ELEVATOR
RE-CIRCULATING CHUTE FROM AIR WASHER
PRESENT BELT CONVEYORS FROM SAND STORAGE HOUSE TO FOUNDRY
CHUTE FROM SCREEN TO FOUNDRY BELT CONVEYOR

← Mechanical Screenin in Combination with Air Classificatio

The drawing to the left is of a recent Link-B installation in a steel foundry where the form practice required a large consumption of n sand for new sand facing. This handling a preparation unit is recovering for reuse a h percentage of this new sand through pro screening and air classification of the shake sand heap.

LET'S GO! U.S.A. KEEP 'EM FLYING!

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8750

LINK-BELT Sand Preparation EQUIPMENT